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PREFACE

While this third volume of the bibliography was in preparation, a number of changes and new developments took place which, it is hoped, will be instrumental in furthering the bibliography's main objective: to provide as rapidly as possible comprehensive coverage of the aerospace-medical and bio-astronautical literature.

To begin with, it will be noted that the title of the compilation has been changed from Aviation Medicine to Aerospace Medicine and Biology. This will bring into relief the fact that the general subject scope of the bibliography has been expanded to include new areas of interest in space-medical and space-biological research. Thus, to the subject fields heretofore covered by the bibliography (a full listing of which may be found in the Preface to Volume 2) new ones have been added, such as Biological Rhythms, Biological Orientation, Closed Ecological Systems, Physiological and Psychological Effects of Heat, Cold, Isolation, Restraint, and many others.

Another important change was administrative in nature. Sponsorship of the bibliography for the fiscal year 1959/60 was taken over by the U. S. Advanced Research Project Agency (ARPA), the U. S. Aeronautics and Space Administration (NASA), and the Defence Research Board of Canada. Under a substantially increased budget, the Library of Congress was enabled to produce two volumes during the fiscal year. The Library also agreed to prepare selected abstracts from the current aerospace and bio-astronautic literature, which are published monthly in Aerospace Medicine, the official organ of the Aerospace Medical Association.*) If the present rate of production can be maintained, it will be possible to bring the bibliography up to date within about three years.

In format, style, and arrangement, this volume follows closely the preceding ones. References are arranged alphabetically by author; abstracts are informative; and full bibliographic information is provided, including foreign and translated titles, volume and issue numbers, place of publication (if foreign), inclusive paging, full dates, and library call numbers or other location symbols. While the bulk of the publication is devoted to journal articles, reports, and monographs published during the year 1954, items published in 1952 or 1953 not included in the preceding volumes have been incorporated in this volume. For quick identification, the publication years of these off-year references have been printed next to the first author's name. As before, cumulated

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*) Reprints of these abstracts are on distribution through NASA to authorized agencies and institutions.

corporate and secondary author and subject indexes are included, the latter being revised and enlarged considerably, in keeping with the over-all expansion of subject scope.

The compilers of the bibliography wish to acknowledge gratefully the good services lent by the Armed Forces-NRC Committee on Bio-Astronautics in providing liaison between sponsoring agencies, researchers, and bibliographers and in planning and coordinating the many functions and activities that go with a bibliographic project of such magnitude. Particular thanks are due to Dr. Sam F. Seeley, Executive Secretary of the Committee, and to Dr. Theodore C. Byerly, Chairman of the Committee's Panel on Information, for their intense and active concern in the progress of the bibliography. We also take this opportunity to thank the representatives of the sponsoring agencies, Mr. J. Gordon Vaeth of ARPA, Messrs. George P. Bates and Bertram A. Mulcahy of NASA, and Mr. Lauchlan F. MacRae of the Defence Research Board of Canada for their interest and assistance. The bibliographers express their grateful recognition to the staff of the National Library of Medicine for their friendly and helpful service. A special note of gratitude is due to the many workers of our own staff, for their personal share in the successful completion of this volume, particularly Mrs. Louise M. Blair, Mr. Aaron S. Dann, Miss Eugenia M. Henry, Mrs. Annette B. Schafer, and Miss Peggy A. Slaughter. Finally, we wish to thank Dr. Benjamin S. Levine, Dr. Francis J. Weiss, and Mr. Nikolay T. Zikeev for helping us out on the abstracting.

BIBLIOGRAPHY

2305
Anonymous 1952
TECHNICAL TOPICS: NOISE.—Jour. Soc. Licensed Aircraft Engineers (London), 1 (3): 1. March 1952.
DLC (TL501.S63752, v. 1)

In a brief note, it is stated that American research projects into the problem of the detrimental effects of engine noise on maintenance personnel have shown that the V-51R ear plug renders best protection against damage. Cotton plugs impregnated with petroleum and paraffin, and flying helmets with dummy wooden plugs in place of earphones occupy second and third place, respectively, in effectiveness.

2306
Anonymous 1953
AVIATION AND CARDIOVASCULAR DISEASE.—Heart Bull., 2 (6): 102-104; 116. Nov.-Dec. 1953. DNLM

The following conditions in flight may have adverse effects upon the cardiovascular system: lack of oxygen (although the development of pressurized cabins has practically eliminated the dangers of anoxia), change of directions at high speed, and emotional factors. In the patient with a diseased heart or circulatory system, deleterious effects may result from exposure to altitudes over 14,000 ft. There may be a failure in the peripheral circulation resulting in circulatory collapse, or an occurrence of angina in patients with an anatomical narrowing of the coronary arteries. An increase in systolic pressure and a decrease in diastolic pressure is often followed by circulatory collapse at increasing altitudes above 14,000 ft. Lowered barometric pressure above 30,000 ft. may result in aero-embolism and aero-emphysema. The standards (as recommended by the Air Surgeon's office) for the disqualification of pilots with cardiovascular impairments are enumerated.

2307
Anonymous 1953
INTRODUCING THE BONE BOX.—Flight (London), 64 (2341): 723-724. Dec. 4, 1953. DLC (TL501.F5, v. 64)

A pilot's crash helmet is evaluated from the standpoint of design, construction, and operational efficiency. The main purposes of the helmet are: (1) to protect the pilot's head against impact either on the ground or during ejection through the canopy and (2) to reflect direct sunlight at high altitudes.

2308
Anonymous 1953
THE MEDICAL SERVICES IN THE KOREAN WAR.—Lancet (London), 264 (6751): 134-135. Jan. 17, 1953.
DLC (R31.L3, v. 264)

A special feature of the British medical services in the Korean campaign was the helicopter evacuation of wounded. These aircraft, flying between the regimental aid-post and the mobile

army surgical hospitals, made it possible to give full surgical treatment to serious casualties within one to three hours of the man being wounded. In addition, the lines of evacuation, the mobile army surgical hospitals, the types of wounded and their treatment, and the results of treatment are reviewed briefly.

2309
Anonymous 1953
NOISE IN INDUSTRY. – Lancet (London), 264 (6758): 480. March 7, 1953. DLC (R31.L3, v. 264)

Jet engine noise (intensity of 120-140 decibels) has little or no effect on the pilot, who sits ahead of it, but is a serious acoustic problem for the ground staff and for personnel of aircraft carriers. Additional factors contributing to acoustic trauma include, the total time of exposure, the duration of each exposure, the frequency and volume of the noise, age of person exposed, and the presence or absence of previous aural disease. Prolonged exposure to noise may have other effects, such as making a person jittery, breaking down body tissue (especially lung tissue), or causing tinnitus. In addition, measures for preventing hearing disorders in a noisy environment are noted.

2310
Anonymous 1953
PILOT VISIBILITY. — Aviation Week, 59 (15): 22, 24. Oct. 12, 1953 DLC (TL501.A8. v. 59)

Pilot cockpit visibility problems dominating the hearings on the in-flight collision of American and United Air Lines Convairs at 11,000 feet, above Michigan City, Indiana, are noted. Possible solutions include provision of cockpits with: (1) flash beacons of high intensity; (2) more windows, (3) periscope mirror; and (4) flight dispatch coordination. Illustrations comparing pilot visibility from five modern airline transports are also presented.

2311
Anonymous 1953
RESCUE AT HOME AND ABROAD. — Flight (London), 63 (2299): 186-188. Feb. 13, 1953. DLC (TL501.F5, v. 63)

Helicopter rescue-work in flooded areas is discussed. Priority tasks include the delivery of two-way radio sets to isolated areas along with drugs and physicians to combat the possibility of a typhoid epidemic. Secondly, sick or infirm women, children, and aged are transported to safety, and thereafter anyone remaining in the disaster area is rescued. An emergency airlift operating in Holland, supplying food, water, medicine, and clothing to the flooded areas and evacuating the casualties, is noted. In addition, helicopter trials in jungle rescue work are described.

2312
Anonymous 1953
THE "SPACE-SUIT" ARRIVES. — Flight (London), 63 (2306): 436. April 3, 1953. DLC (TL501.F5, v. 63)

A high-altitude suit incorporating an automatic anti-g device is described and illustrated. The suit is worn uninflated, but inflates automatically should cabin pressure fail. The inflated suit and helmet then supercharge the wearer's lungs with high-pressure oxygen and simultaneously apply counter-pressure to the body surface. The equipment combines suit, helmet, oxygen mask, earphones, microphone, goggles and a bail-out oxygen bottle.

2313
Anonymous 1953
A STUDY IN DISCOMFORT. — Flight (London), 63 (2311): 566-567. May 8, 1953. DLC (TL501.F5, v. 63)

Problems of physical discomfort in the aircrew caused by climatic extremes may be studied under laboratory conditions. The major areas of research include: climatic problems, such as the maximum permissible

temperature for the performance of a given work; investigations requiring very accurate control conditions, such as control of body temperature; and work in fields not strictly climatic but in which control of the environment is important, such as survival requirements. The climatic laboratory houses various components of a wind tunnel (providing a steady low-speed airflow, or variables of temperature, humidity, ventilation, sun effect and rain); an adjacent air-conditioned room (for tunnel acclimatization, transfer experiments, and other work); a metabolism room (for body-heat studies not requiring full wind-tunnel facilities); and clothes-conditioning and clothes-drying rooms for investigation of the thermal properties of clothing. In addition, dietary studies in connection with provision of survival food-packs are performed.

2314
Anonymous 1953
TECHNICAL TOPICS: FLIGHT SAFETY SEMINAR. — Jour. Soc. Licensed Aircraft Engineers (London), 2 (9): 1. Sept. 1953 DLC (TL501.S63752, v.2)

A brief description is given of discussions which occurred at the Flight Safety Foundation's seminar at Cranfield on Sept. 11-13. Topics discussed include the intercompany exchange of aircraft defect information, emergency exits, the superiority of red over yellow for sightings at sea, the location of engine controls, radio-equipped life jackets, and the development of a high-powered aircraft beacon light by United Airlines.

2315
Anonymous
AIR TRAVEL AND HEART DISEASE. — Jour. Amer. Med. Assoc., 155 (13): 1160-1161. July 24, 1954.
DLC (R15.A48, v. 155)

The death rate among cardiac patients and the number of heart attacks during flight, according to statistical data, is extremely low. The fact that such incidents are fewer, however, in pressurized than in non-pressurized airplanes is proof that flying stress is a factor, none the less. It might be wise for a person with heart disease to travel only in airliners equipped to administer oxygen in emergencies.

2316
Anonymous
AVIATION MEDICAL LABORATORY OPENS. — Canad. Aviation (Toronto), 7 (3): 32, 34. March 1954.
DLC (TL501.C33, v. 27)

The new Defense Research Medical Laboratories, which opened recently, has developed from a merger of the Medical Research Laboratories with the Royal Canadian Air Force Institute of Aviation Medicine. Its current location is at Downsview. Included are: the Personnel Research Section, the Aerophysiology team, the Applied Physiology Section, the Physiology-of-Cold Section, the Motion Sickness and Disorientation team, the Sonics Section, the Toxicology Section, and the Biostatics Section. Acceleration studies are particularly concerned with cardiovascular research on human and animal subjects. Gravity tolerance studies are being conducted with and without various types of g-suits. An electronic human centrifuge capable of producing forces up to 20 g is used. Recording equipment is incorporated in the machine for continuous recording. Clarification of decompression sickness symptoms is attempted with the aid of a Bell-type decompression chamber, simulating atmospheric conditions up to altitudes of 80,000 ft. The role of ascorbic acid in increasing cold tolerance is investigated. The Motion Sickness and Disorientation team has discovered a relation between the degree of head motion and individual susceptibility to nausea and is investigating further the precise direction and speed of head movements. The staff is assisted by a selected group of consultants in diverse fields.

2317
Anonymous
BACKLIGHTED INSTRUMENT PANELS DECREASE PILOT FATIGUE. — Aviation Age, 22 (2): 96-98. Aug. 1954.
DLC (TL501.A8187, v. 22)

In order to reduce pilot fatigue caused by difficulties in reading certain types of instrument panels during night flight, the following desired properties are specified: (1) control plates should be made of plastic, able to withstand the extremes of temperature and stress in high-flying aircraft; (2) lettering and markings should be flush wherever possible; (3) the black outer surface should have as low a specular gloss as possible, yet show a marked contrast with white lettering; (4) there should be no objectionable parallax up to 60°; (5) when lighted at night, there should be no shadows and a maximum of light transmission; and (6) the red lighting should be within a specific range of the spectrum for eye ease and to prevent after-image. A method for making panels according to these specifications is described.

2318
Anonymous
BEST TEST. — Flying Safety, 10 (7): 28. July 1954. DLC

The procedure for a simple preflight check of demand oxygen regulators for outward leakage is described. It should be mandatory equipment for every crew member before takeoff.

2319
Anonymous
[THE BEHAVIOR OF MONKEYS AND MICE AT 100 KILOMETERS OF ALTITUDE] Le comportement des singes et des souris à 100 kilomètres d'altitude. —Atomes (Paris), 9 (95): 61. Feb. 1954. In French.
DLC (Q2.A78, v. 9)

This is essentially an abstract of the paper, Henry, J. P., 1952 (vol. 1, item no. 475).

2320
Anonymous
[ELECTROCARDIOGRAMS DURING FLIGHT] Electrocardiogrammes en plein vol. — Atomes (Paris), 9 (94): 24. Jan. 1954. In French.
DLC (Q2.A78, v. 9)

A brief description is presented on a technique for recording electrocardiograms in pilots during flight at 7,000 meters of altitude in full acceleration or deceleration.

2321
Anonymous
EXPLOSIVE-DECOMPRESSION TESTS IN U.S.A. — Flight (London), 65 (2364): 618. May 14, 1954.
DLC (TL501.F5, v. 65)

As part of a high-altitude indoctrination training program incorporating explosive decompression, a group of flight personnel were subjected to a simulated altitude of 43,000 feet in a decompression chamber, followed by exposure to hypoxia at 28,000 feet, pressure breathing, simulated free fall, and explosive decompression from 8,000 - 25,000 feet in less than one second. A second group, consisting mainly of ground-servicing personnel, participated in a less intensive program, two of the limits being 32,000 feet simulated altitude and 20,000 feet as the limit of explosive decompression. The physiological and mental effects of the decompression are discussed. No serious disturbances were demonstrated at altitudes below 30,000 feet, particularly if previous experience under controlled conditions had been gained.

2322
Anonymous
[ACTIVITIES OF THE AERO - AND NAVAL-MEDICAL COUNCIL IN 1953] Flygoch navalmedicinska nämnden verksamhet under år 1953. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 3 (2): 1-9. 1954. In Swedish. DNLM

The Flyg- och Navalmedicinska Nämnden (Aero- and Naval-Medical Council) was established in 1946 to function as an applied research organization in the fields of aviation and naval medicine, and as a central consulting bureau servicing state authorities and private organizations. Research activities are primarily conducted in the Karolinska Institut, the Gymnastika Centralinstitut, and the University of Lund. The equipment, work, and research papers published by these institutions in 1953 are discussed.

2323
Anonymous
THE HEAT IS OFF. — Flying Safety, 10 (9): 12-13. Sept. 1954. DLC

An experimental anti-exposure suit has been developed and tested by the Air Research and Development Command's Wright Air Development Center. It provides air conditioning against heat, as well as insulation and a waterproof outer shell for protection against cold and water. The principle employed is heat transfer by evaporation through the inner layer of the double layered suit into a spacer material through which is directed a cooling air flow. This suit is designed for thermal comfort at cockpit temperatures of 165°F., and it may be worn with an anti-g suit or with a partial pressure suit.

2324
Anonymous
IF THE CHUTE FITS. . . — Flying Safety, 10 (3): 14-16. March 1954. DLC

Steps for proper fitting of the Class III harness are enumerated, as it has been found that it is possible to fall out of a parachute if the harness has not been adjusted for the size of the wearer.

2325
Anonymous
THE MAN-MACHINE SYSTEM. — Aviation Age, 22 (1): 240-245. July 1954. DLC (TL501.A8187, v. 22)

Cockpit design including instrumentation and control systems, pilot clothing, and crashworthiness are reviewed bearing in mind anthropometric and psycho-physiological factors. Human aerodynamics and pilot heat tolerance with relation to the development of flight suits and cockpits are also noted.

2326
Anonymous
MERCY PLANE. — Aviation Week, 60 (14): 14-15. April 5, 1954. DLC (TL501.A8, v. 60)

The Convair C-131A Samaritan aeromedical transport is described and illustrated. Each plane carries up to 27 litter cases, and its chief mission is to deliver patients from ports of entry to hospitals of destination throughout the U.S.

2327
Anonymous
"OPERATION STANDARD." — Flying Safety, 10 (7): 18-25. July 1954. DLC

The progress in standardization of the cockpit layout, instrument panel, controls, and warning lights for airplanes and helicopters is reviewed.

2328
Anonymous
PHOTIC CONVULSIONS. — Brit. Med. Jour. (London), no. 4867: 925-926. April 17, 1954. DLC (R31.B93, 1954)

This is a review of the literature concerning abnormal photosensitivity to rhythmic visual stimulation. As a result of cases reported in the medical literature, where epileptic seizures were apparently induced by flashing lights, it was also experimentally verified that rhythmic visual stimulation produced epileptic discharges in the electroencephalogram, myoclonic jerks, arrest of speech, and clinical petit mal. Abnormal photosensitivity may occasionally occur in subjects, who have never had any spontaneous

epileptic attacks, e.g. hysterics, schizophrenics, and children with behaviour problems. There is experimental evidence that effective flash frequencies lie between ten and twenty flashes per second, with myoclonic jerks as the commonest clinical manifestation. As an adjuvant to drug therapy, dark glasses have been used to cut down the intensity of light stimulation. Trimethadione and amylobarbital are the most effective drugs in diminishing photosensitivity. The former, although the most effective of all, has unpleasant side-effects of producing glare and other visual disturbances. Differing opinions have been expressed concerning pathways reponsible for the abnormal spread of impulses from the visual to the motor systems. Both subcortical (i.e., possible thalamic) leak and pretectal region have been implicated experimentally. (Quoted in part)

2329
Anonymous
PILOT FATIGUE. — Flight (London), 66 (2397): 947. Dec. 31, 1954.
DLC (TL501.F5, v. 66)

Recommendations for limiting pilots' flight time, based on aircrew fatigue factors, are proposed. For short-haul operations, the maximum duty day should be 10 hours for a day flight and 9 hours for a night flight. Periodic limitations for short-haul operations should be as follows: maximum duty time in 7 consecutive days, 50 hours; in one calendar month, 100 hours; in one quarter, 255 hours; in one calendar year, 935 hours. — For long-haul operations with a two-pilot crew, the maximum duty day should be 16 hours for a day flight and 13 hours for a night flight. The periodic limitations should be as follows: maximum flying time in one calendar month, 120 hours; in one quarter, 300 hours; in one calendar year, 1,000 hours. — For a three-pilot crew the maximum duty day should be 22 hours for a day flight and 19 hours for a night flight.

2330
Anonymous
. . . POSITION IS EVERYTHING — Flying Safety, 10 (6): 12-13. June 1954. DLC

Some common errors made in the techniques of strapping in prior to jet flight, and in the positioning of the body and preparation for ejection are listed, as determined in a dry run of a squadron of pilots through the ejection procedures. Several recommendations are made for proper positioning of the body.

2331
Anonymous
READ IT AND KNOW. — Flying Safety, 10 (3): 18-20. March 1954. DLC

The danger of misreading the altimeter is discussed, as studies by the Aero Medical Laboratory show that the three-pointer altimeter may be easily misread 1000-10,000 ft. too high. Accidents, primarily collisions with mountains and landings short of the runway, are known to have been caused by altimeter reading errors. Studies of eye movements show the time spent by the pilots for altimeter check to be on the average four-tenths of a second, which was proven to be quite insufficient for actual quantitative reading. A new altimeter, combining pointer with counter readings, is under development by the Air Force.

2332
Anonymous
SPARE THE SPACEMAN. — Flying Safety, 10 (3): 21. March 1954. DLC

Problems connected with escape from aircraft at extremely high altitudes, (up to 300,000 ft.) and requirements for protective devices are discussed.

Ackeren, J. F., van see Van Ackeren, J. F.

2333
Adams, J. A.
EFFECT OF EXPERIMENTALLY INDUCED MUSCULAR TENSION ON PSYCHOMOTOR PERFORMANCE. —

Jour. Exper. Psychol., 48 (2): 127-130. Aug. 1954. DLC (BF1.J6, v. 48)

Under investigation were the effects of experimentally induced muscular tension on the acquisition of a psychomotor response, and whether such effects were related to learning or performance. The Two-Hand Matching Test was used. The subjects in each of three experimental groups kept either 10, 20, or 30 lb. suspended by pressing stirrups to the floor throughout the trials of an initial practice session. Following rest, a final practice session was given without induced muscular tension. Comparison with a control group which practiced throughout without weights was made. Results were negative. The experimental groups and the control group did not differ importantly at any stage of training, nor did evidence support the hypothesis that tension would be detrimental to high-ability subjects and beneficial for low-ability subjects. (Author's summary)

2334
Adams, J. A.,
and B. Reynolds
EFFECT OF SHIFT IN DISTRIBUTION OF PRACTICE CONDITIONS FOLLOWING INTERPOLATED REST. — Jour. Exper. Psychol., 47 (1): 32-36. Jan. 1954. DLC (BF1.J6, v. 47)

Five groups of airmen trainees were given 40 15-sec. trials with 5-sec. intertrial rest periods for massed practice and 45-sec. rest periods for distributed practice on a rotary-pursuit-test apparatus. The control group received distributed training throughout. The four experimental groups had either 5, 10, 15, or 20 trials of massed practice, a 10-min. rest, and the balance of the trials under distributed practice. The results imply that massing of practice does not lead to the development of any permanent decremental states. Distribution of practice is regarded as a performance rather than a learning variable. (From the authors' summary)

2335
Adams, J. A.
PSYCHOMOTOR PERFORMANCE AS A FUNCTION OF INTERTRIAL REST INTERVAL. – Jour. Exper. Psychol., 48 (2): 131-133. Aug. 1954.
DLC (BF1.J6, v. 48)

Performance on a paced psychomotor task was evaluated as a function of intertrial interval. The Rotary Pursuit Test was used, and 150 trials were given. Trial length was constant at 30 sec., and each group had one of the following intertrial intervals: 0, 3, 10, 20, or 30 sec. It was found that performance curves for all groups were negatively accelerated increasing functions. Rate of approach to the asymptote was positively related to length of intertrial interval. Asymptote level appeared to be a negatively accelerated increasing function of intertrial interval. (Author's summary)

2336
Adams, J. A.
PSYCHOMOTOR RESPONSE ACQUISITION AND TRANSFER AS A FUNCTION OF CONTROL-INDICATOR RELATIONSHIPS — Jour. Exper. Psychol., 48 (1): 10-14. July 1954.
DLC (BF1.J6, V. 48)

The Pedal Control Test was used to evaluate the effect of control-indicator relationship on psychomotor response acquisition and on transfer of training to another form of the same task, where control-indicator relationship had been changed. The subjects were 142 basic airmen trainees, assigned randomly to five treatment groups. Response acquisition was found to be independent of the five control-indicator relationships investigated. This suggested the hypothesis that bodily members that are infrequently used for response in control-indicator systems found in everyday life do not show preference for control-indicator relationships. With respect to transfer of training, it was found that when control-indicator relationship differed between two forms of the task, practice on one resulted in

initial positive transfer to the other, and the amount was directly proportional to the correspondence between the two control-indicator relationships. Training on the second task decreased this initial advantage until, at the end of training, three of the four experimental groups were not significantly different from the control group. A fourth experimental group, which had complete reversal of control-indicator relationship from one form of the task to the other, exhibited negative transfer in the later stages of training. (Author's summary, modified)

2337
Adams J. M.,
and H. M. Ferres
OBSERVATIONS ON ORAL AND RECTAL TEMPERATURES IN THE HUMID TROPICS AND IN A TEMPERATE CLIMATE [Abstract]. — Jour. Physiol. (London), 125 (1): 21P. July 28, 1954. DLC (QP1.J75, v. 125)

Recordings were made of oral and rectal temperatures from healthy, young male subjects taking part in climatic experiments at Singapore and Oxford. Two series of experiments were carried out in Singapore, and, in series A, measurements were made at six specified times daily for 8 days on 14 subjects. In series B, temperatures were recorded at 1/2-hr. intervals from 6:30 A.M. to 10 P.M. on 7 subjects from 2-7 days. In Oxford, half-hourly recordings were made on 7 subjects for 7 days. The subjects at Singapore had been stationed there for an average of 18 mo., and were therefore naturally acclimatized to heat. The mean temperatures at Singapore were 79.9° F. dry-bulb and 76.2° F. wet-bulb, and in Oxford were 64.1° F. dry-bulb and 56.3°F. wet-bulb. The Singapore subjects wore shorts, shirt, and sandals; in Oxford, the subjects wore vest, long pants, serge trousers, socks, shoes, and a light sweater. The results show a similar diurnal variation in Oxford and Singapore. Rectal temperatures were higher at Singapore than at Oxford, the difference being highly significant; the mean difference was 0.43° F. Oral temperatures were also higher at Singapore, and this difference, too, was highly significant, the mean difference being 0.35° F. (Quoted in part)

2338
Adams, S.
PROBLEMS IN TWELVE AIR FORCE RESERVE INSTALLATIONS: A PRELIMINARY REPORT. — Human Resources Research Inst., Maxwell Air Force Base, Ala. Research Memorandum no. 27, Jan. 1954. iv+18 p. AD 35 932 PB 117973

A summary is presented of two classes of problems in the organization and execution of the Air Force Reserve program. The first consists of reasons for the nonparticipation of reservists in the Reserve training program; the second includes all other types of problems encountered in the formulation and administration of the Reserve program. Evaluation of the reports of the administrative staffs and recruiting sections, together with detailed study of the program of one flying training wing, suggests that (1) the problem of non participation appears to be the most serious problem faced by the Reserve organization; (2) much of the responsibility for the low rate of participation falls on the undeveloped and unevaluated character of the training program; (3) the development of sound training programs should aid appreciably in attracting new participants and in holding those personnel now participating; (4) the reserve organization would profit particularly with regard to exchange of ideas on training procedures and personnel policies; (5) the high turnover rate among airmen in flying training wings requires special attention because of the public relations problems and the threat of depletion of potential participants in some areas; and (6) an information-gathering and information-exchange program appears to be needed to reduce the amount

of trial-and-error development in the local units. (AD abstract)

2339
Adiseshiah, W. T. V.
HUMAN FACTORS IN AIRCRAFT ACCIDENTS. — Aero Med. Soc. Jour. (New Delhi), 1 (1): 28-37. April 1954. DNLM

A study of the Indian Air Force Flying Accident Ladder reveals that a high proportion of aircraft accidents has been classified as avoidable. It is evident that the proportion of avoidable to unavoidable accidents does not remain fixed over a long period of time. Two points, however, were noted: (1) more single-engined aircraft were involved in avoidable accidents; and (2) the majority of avoidable accidents occurred when the aircraft was coming in to land. The tropical climate is assumed to be a very significant factor in the causation of accidents classified as unavoidable. An analysis of seasonal variations in accident rates, recently carried out at the Defence Science Laboratory, brought out that accident rates for single-engine aircraft show a tendency to rise to high proportions during summer months. There are no sharp seasonal variations in the accident rates for multi-engined aircraft. Sufficient information is not available to tell whether the increase in accident rates during summer is due to the effect of high summer temperatures on the machinery or due to the effects of thermal stress on personnel performance. It is known, that cockpit temperatures in summer can rise up to 130°F. The author discusses the physical, physiological, and psychological factors which limit flying efficiency. Among recommendations to reduce flying accident rates in India are: (1) full time staff for accident analysis; (2) immediate action in the event of an aircraft accident; (3) investigation of pilot error with special attention to factors applicable to conditions in India; and (4) improvement of ground facilities.

2340
Adler, H. E.,
John L. Brown, and R. M. Herrick
THE EFFECTS OF PUPIL SIZE AND FLASH DURATION ON ACUITY DURING ADAPTATION. — Columbia Univ., New York (Contract AF 33(038)-22616); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-551, Nov. 1954. iii + 11 p. (Project no. 7186). AD 63 261. PB 118439

The minimum luminances required for the resolution of each of three acuity gratings were obtained five seconds after the end of adaptation to each of four luminances and after thirty minutes of dark adaptation. Such thresholds were found using either the natural pupil or a 3-mm. artificial pupil in combination with a 0.016-second test flash duration or a 0.40-second test flash duration. The purpose of the experiment was to determine what effects flash duration and pupil condition have upon luminance thresholds when the testing conditions more closely approximate applied Air Force situations. The results indicate that when the natural pupil is used in combination with a 0.40-second flash duration, the threshold luminances are considerably lower than the thresholds obtained with the other flash duration—pupil condition combinations. Most of the reduction in threshold is related to the increase in the flash duration; a small amount of the reduction in threshold luminance is dependent upon pupil condition. (Authors' abstract)

2341
Adolph, E. F.
WATER METABOLISM IN HOT CLIMATES. — In: Spector H. and M. S. Peterson, (ed.), Nutrition under climatic stress. . . , p. 63-66; discussion, p. 66-69. Nat. Acad. of Sci.—Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 PB 117996

Man is able to dissipate heat in a hot atmosphere only by evaporative cooling through sweat, provided evaporation is possible. In a hot atmosphere saturated with moisture evaporation is limited, even though the sweating rate may increase. On an inadequate water intake, dehydration develops and becomes the limiting factor in human performance. This limitation is largely attributable to circulatory inadequacy: evaporation of sweat suffices for surface cooling; however, the blood return to deep tissues is inadequate for prevention of a rise in body core temperature. Explosive rise of deep body temperature ensues and eventually heat stroke. Animal experiments with water curtailment suggest that a damage in the central nervous system occurs as soon as the deep tissues have experienced a temperature of 42° C. Adaptation to hot environments is chiefly by avoidance of exposure to direct heat sources and restriction of the amount of work done. There is no adaptation to continued dehydration. A study of thirst patterns is suggested, as some debilitation due to dehydration occurs in individuals because of inadequate voluntary water intake.

2342

Aero Med. Lab. 1953

ALAR COMBINATION EXPLOSIVE DECOMPRESSION RELIEF VALVE AND COMPENSATED EXHALATION VALVE. PROTOTYPE EVALUATION. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Memorandum Report no. WCRD 53-135, July 1, 1953. 10 p. AD 69 219

UNCLASSIFIED

The Alar combination valve was evaluated as a practical solution to the combination of breathing valve and emergency exhalation valve for use on high pressure breathing helmets. Pressure-flow characteristics of the Alar valve indicate the necessity for closer balance in the compensating mechanism to reduce subjective discomfort while breathing with the valve. The emergency exhalation feature of the valve for use only during explosive decompression is satisfactory. Recommendations are made for certain modifications.

2343

Ahlman, K. L., 1953
O. Eränkö, M. J. Karvonen, and V. Leppanen

EFFECTS OF PREHYDRATION AND REPEATED OR PROLONGED THERMAL STRESS ON THE ELECTROLYTE CONTENT OF THERMAL SWEAT. — Acta endocrinologica (Copenhagen), 12 (2): 140-146. Feb. 1953. In English.

DNLM

Changes in the sodium, potassium, and chloride concentration of thermal sweat were studied on 20 young men, with and without prehydration, under repeated or prolonged thermal stress. The thermal stress was induced by sweating in a Finnish sauna at a temperature between 69° and 77° C. with a relatively low humidity. The only sources of humidity were the expired air and the sweat of the subjects. The following results were obtained: (1) prehydration did not cause any significant changes; (2) the repetition of the thermal stress at an interval of 1 or 3 days produced a significant increase in the sodium and chloride concentration of thermal sweat. The potassium concentration did not change significantly; (3) when two successive samples were taken during the same exposure the latter showed a significant decrease of the potassium content, while no significant changes were observed in sodium and chloride. It is pointed out that repeated exposure to thermal stress and extreme muscular work have opposite effects on the sodium and chloride concentration of sweat. The possible role of the adrenal cortex in the observed phenomena is discussed. (Authors' summary, modified)

2344

Ahn, B. von

THE ACUTE EFFECT OF TOBACCO-SMOKING AND NICOTINE ON

THE ELECTROCARDIOGRAM ESPECIALLY DURING INDUCED HYPOXIA: A CLINICAL AND EXPERIMENTAL INVESTIGATION. — Acta Medica Scandinavica (Uppsala), 149 (Supplement 292): 1-112. 1954. In English.
DNLM

From the experimental results it was concluded that tobacco-smoking or injection of nicotine during hypoxia results in an increase of the heart rate, an increase in the amplitudes of the P-waves, flattening of the T-waves, and a slight depression of the S-T segments. Statistical analysis of the electrocardiographic findings supported the hypothesis that the effect of nicotine in the doses used on the ECG is chiefly due to the increased heart rate. Comparative hypoxia experiments with nicotine, adrenalin, atropine, and physical work pointed to an increased sympathetic tone as follows: (1) Dihydroergotamine impedes the effect of nicotine on the electrocardiogram; on the other hand, heavy work may change a vagotonic ECG in a sympatheticotonic direction. (2) Atropine may lead to approximately the same degree of flattening of the T-waves as does nicotine. (3) There is practically no flattening of T-waves or no depression of S-T segments after elimination of the heart rate effect due to nicotine. Physical work during hypoxia leads to more marked flattening of the T-waves and depression of the S-T segments than nicotine under the same conditions. In certain cases heavy smoking or injection of nicotine results in flattening of the T-waves without simultaneously incurring increase in heart rate. This is probably due to increased adrenal secretion. It is very unlikely that the ECG changes provoked by smoking or injection of nicotine during hypoxia are of coronary origin in persons with clinically healthy hearts. (From the author's summary)

2345
(Air Force)
YOUR BODY IN FLIGHT. – Department of the Air Force, Washington, D. C. Air Force Manual no. 51-7, Feb. 1954. iv + 82 p.
DLC (UG633.A3763)

A popular multi-illustrated manual is presented for flight personnel on the importance of taking proper precautions to protect themselves during flight. The discussions of high altitude, O_2 systems and masks, cabin and body pressurization, centrifugal force, noise and communications, equilibrium and orientation, vision, body comfort, escape and crash survival, and fear in flight are especially tailored to the needs of flight crews.

2346
(Air Proving Eglin)
EVALUATION OF GRADUATES OF AIR OPERATIONS SPECIALISTS COURSE. — Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, Sept. 30, 1954. 30 p. (Project no. APG/CSC/337-A). AD 44 111
UNCLASSIFIED

Job performance ratings were obtained on graduates of the Air Operations Specialist Course No. AB27130 to determine their ability to perform work for which they were trained, the job areas for which improved training is needed, and information for the better utilization of course graduates. The graduates were trained as Air Operations Specialists at apprentice level. Duties of the specialty included the scheduling and dispatch of aircraft, the arrangement of military air transportation of military and civilian personnel, and the preparation and maintenance of record on air passenger and operations activities. Investigation revealed that the graduates had insufficient knowledge of the job to develop senior-level proficiency without a considerable period of on-the-job training. Graduates had received an excess of training in certain areas of nonessential information, but had no training in basic typing, application of regulations to actual job situations, functions of the flight-scheduling section, or knowledge

of passenger services. They had received insufficient training in communications procedure. (AD abstract)

2347
(Air Proving Eglin)
EVALUATION OF GRADUATES OF AIR TRAFFIC CONTROL OPERATOR COURSE. — Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report. March 24, 1954. 19 p. (Project no. APG/ADA/74-A). AD 28 002 UNCLASSIFIED

An evaluation was made of the ability of graduates of the subject course to perform the duties for which they were trained. The 70-day course consists of the following phases: orientation and weather, 10 days; navigational aids and equipment, 15 days; air traffic regulations, 10 days; air traffic control, 10 days; air route traffic control, 15 days; and radar utilization in air traffic control, 10 days. The four graduates of the course who were tested were considered to be adequately trained for their assignments, except for the following deficiencies: inadequate skill in aircraft recognition, development of the habit of giving traffic instructions before checking aircraft traffic-pattern position, and inability to adapt standard phraseology to special situations. (AD abstract)

2348
(Air Proving Eglin)
EVALUATION OF GRADUATES OF AIRBORNE ELECTRONIC NAVIGATION EQUIPMENT REPAIRMAN COURSE. — Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, April 21, 1954. 22 p. (Project no. APG/SAE/154-A). AD 30 538 UNCLASSIFIED

An evaluation was made immediately after graduation of four airmen to determine their ability to perform the duties for which they were trained. The 180-day course consists of (1) 110 days, radar fundamentals; (2) 25 days, light-weight air-borne equipment (AN/APN-1, -12, and SCR-718); (3) 10 days, long-range navigation equipment (AN/APN-9); (4) 20 days, search portion of AN/APQ-13; and (5) 15 days, maintenance techniques and test equipment. Results indicated that the course produced graduates who had a knowledge of radar principles and circuits, typical radar installations, maintenance procedures, and test equipment which was adequate to enable them to develop skills to senior level within 6 months. The graduates were deficient in their knowledge of standard inspection forms and procedures for completing the forms; they were also inadequately trained in the use of technical orders and stock lists. Graduates were not sufficiently proficient in making precise judgments when using present test equipment. (AD abstract)

2349
(Air Proving Eglin)
EVALUATION OF GRADUATES OF AIRCRAFT CONTROL AND WARNING RADAR REPAIRMEN COURSE. — Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, March 23, 1954. 24 p. (Project no. APG/ADA/73-A). AD 29 392 UNCLASSIFIED

Graduates of the course received excellent training in the fundamentals of electronics as applied to radar and an understanding of the application of electronic principles in representative-type AC&W radar equipment. The objectives of the radar repairman course are to produce an apprentice radar repairman with sufficient technical background to enable him to progress to the level of senior AC&W radar repairman without additional formal training and with a minimum of on-the-job experience, and to train him to a semiskilled level in performing the regular maintenance of AC&W radar equipment. The study indicated that the course trains a semiskilled radar repairman who has an adequate technical background. Graduates of the course have insufficient opportunity to perform practical work, and consequently they cannot be considered semiskilled when

performing tasks involving AFC alignments, tuning of sets, phasing of the modulator spark gap, the use of test equipment, and the identification, removal, and replacement of units. Graduates of the course were not properly instructed on the scope of information contained in technical orders, and on the proper methods of usage of technical orders and supply catalogs. (AD abstract)

2350
(Air Proving Eglin)
EVALUATION OF GRADUATES OF AIRCRAFT HYDRAULIC MECHANIC COURSE. — Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, March 18, 1954. 19 p. (Project no. APG/CSC/300-A). AD 28 042
UNCLASSIFIED

The graduate of the Aircraft Hydraulic Mechanic Course was able to perform the duties for which he was trained except with respect to use of shop-type hydraulic test stands and making full use of technical orders. The course did acquaint the graduate with representative types of equipment and develop an understanding of the functions and basic operating principles so that other equipment could be readily understood, but did not emphasize actual use of the stand for testing hydraulic equipment. The course acquainted the graduate with the indexing system and content of technical orders, but did not familiarize him with the mechanics of locating, selecting, and interpreting the information in the technical order which is applicable to the problem. Additional course emphasis is recommended on the importance of the work to flight safety. (AD abstract)

2351
(Air Proving Eglin)
EVALUATION OF GRADUATES OF AIRCRAFT MECHANIC, JET FIGHTER COURSE. – Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, March 23, 1954. 22 p. (Project no. APG/ADA/71-A). AD 30 537
UNCLASSIFIED

Graduates of the aircraft mechanics, jet fighter, course were tested to evaluate their ability to perform the work for which they were trained, to determine job areas where training should be improved, and to provide information for better utilization of course graduates. Results indicate that (1) the aircraft mechanic, jet fighter, course produces semiskilled apprentices who possess an adequate knowledge of the functions and operation principles of typical fighter aircraft systems; (2) the graduate is inadequately trained in servicing and lubricating procedures and is not familiar with the system installations and maintenance peculiarities of specific aircraft; and (3) after assignment, the graduate requires immediate supplementary training to provide familiarity with the location and maintenance requirements of the systems of the specific type of aircraft he is to maintain. The present course is considered to provide more instruction on electrical systems and engine operation than the graduate requires. (AD abstract)

2352
(Air Proving Eglin)
EVALUATION OF GRADUATES OF TRACKING RADAR REPAIRMAN COURSE. — Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, Oct. 14, 1954. 36 p. (Project no. APG/CSC/341-A). AD 45 994
UNCLASSIFIED

Evaluation was made of the ability of graduate radar repairmen to perform the work for which they were trained, which included the installation, operation, maintenance, and repair of automatic tracking radar, shoran systems, and associated equipment. Graduates were trained for work at the apprentice level with sufficient technical background to permit progression to senior level skill without further formal training. Graduates of the training course possessed an excellent background knowledge of radar fundamentals; they learned specific maintenance duties within 3 to 6 months on

the job. However, the study revealed that more training should be concentrated on the AN/MSQ-1 and MSQ-2 sets rather than on the SCR-584 equipment. Course specialization on the MPS-9 radar equipment is recommended, along with training at circuit analysis level on the OA-132 and OA-215 type consoles. The responsibility for tactical operation of the radar equipment was added to the job description and resulted in the need for incorporating operational training into the course. (AD abstract)

2353
(Air Proving Eglin)
EVALUATION OF GRADUATES OF MUNITIONS SPECIALIST COURSE. – Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, Sept. 9, 1954. 26 p. (Project no. APG/CSC/329-A). AD 44 112
UNCLASSIFIED

Job performance ratings were obtained on graduates of the Technical Training Air Force Munitions Specialist Course No. AB46130 to determine their ability to perform job duties. Graduates were capable of performing the duties of the specialty with senior-level skill after a brief period of on-the-job familiarization. The duties of the specialty are (1) to maintain, assemble, deliver, grade, renovate, and destroy explosive, incendiary, toxic, and atomic munitions; (2) to store and handle solid-propellant rockets and liquid-propellant fuels; and (3) to decontaminate agents and equipment exposed to toxic agents and radioactive materials. The graduates lacked first-hand knowledge of the destructive effects of munitions and had inadequate knowledge of the operation and maintenance of munitions-handling equipment. (AD abstract)

2354
(Air Proving Eglin)
EVALUATION OF GRADUATES OF VEHICLE AND MOTORIZED EQUIPMENT ENGINE MECHANIC COURSE. – Air Proving Ground Command, Eglin Air Force Base, Fla. April 22, 1954. 26 p. (Project no. APG/CSC/290-A and APG/CSC/290-A-1). AD 31 991
UNCLASSIFIED

An evaluation was made (1) to determine the ability of the graduates of Technical Training Air Force (TTAF) course no. 47154 (Vehicle and Motorized Equipment Engine Mechanic Course) to perform their duties; (2) to provide the Air Training Command with information which will assist in the development of better qualified personnel; and (3) to provide other USAF agencies with information which will assist them in the utilization of graduates of TTAF course no. 47154. Results indicated that the apprentice-vehicle and motorized equipment mechanic is inadequately trained for a majority of the assignments within his specialty code. His training is satisfactory, however, for use in the vehicle maintenance of engine-powered ground-support equipment. A requirement for an apprentice vehicle mechanic who is trained to work, not only on engines but on other vehicular components and systems, exists because of the difficulty in obtaining full-time utilization of specialized engine mechanics. The apprentice-vehicle and motorized-equipment engine mechanic received training on diesel engine repair that is not normally required for his specialty. The maintenance of engine-powered ground-support equipment could be improved by the establishment of a separate specialty exclusively for this work. (AD abstract)

2355
(Air Proving Eglin)
EVALUATION OF GRADUATES OF WEATHER OBSERVER COURSE. – Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, Oct. 4, 1954. 21 p. (Project no. APG/CSC/340-A). AD 44 007 UNCLASSIFIED

Five graduate airmen who had completed a 16-week Weather Observer course of study were evaluated with respect to their ability to perform the

duties for which they were trained. During the 90 days of the test, the airmen performed normal duties and presented notes on the details of their work. With minor exceptions, the graduates were excellently trained to perform the duties of their specialty. Reduction in the time alloted to equipment maintenance and weather-charts plotting would allow additional training on subjects where less proficiency has been developed. (AD abstract)

2356
(Air Proving Eglin)
FINAL REPORT ON EVALUATION OF GRADUATES OF AIRCRAFT ELECTRICIAN COURSE. — Air Proving Ground Command, Eglin Air Force Base, Fla. Oct. 10, 1954. 24 p. (Project no. APG/CSC/339-A). AD 48 394
UNCLASSIFIED

Evaluation of a group of graduates of the aircraft electrician course led to the following general conclusions: (1) the graduates were adequately trained in the essential elements required for their assignment, with the exception of the skill and knowledges required for replacement and repair of aircraft wiring and Cannon plugs; and (2) the utilization of aircraft electricians would be greatly improved by assignments to specific types, or groups of similar type, of aircraft. Recommendations are included for reduction in course length, additional formal training, and personnel assignment control.

2357
[Air Trainers Ltd., Aylesbury, Gt. Brit.]
ADVANCED BRITISH FLIGHT SIMULATOR. — Shell Aviation News (London) no. 194: 12-13. Aug. 1954.
DLC (TL501.S55, no. 194)

A brief, well illustrated description of a flight simulator installed by the British European Airways for the training of their crews is presented. Among its special features are the following: equipment for applying simulated air loads; a control panel accessible to the instructor while watching the trainee, enabling him to create at will any of over 160 symptoms of trouble requiring emergency action; control for simulating turbulence, icing, barometric changes, and other flight conditions; extensive simulated facilities for radio navigation; and recorders which automatically trace the aircraft's ground track and give, on an enlarged scale, a three-dimensional record of its flight path during an ILS let-down.

2358
AIRBORNE ELECTRONICS 1952. — vi + 197 p. [No place]: Conference on Airborne Electronics, 1952.
DLC (TL693.A3)

Abstracts of papers delivered at the 1952 Conference on Airborne Electronics are presented. A section on human engineering includes the description of a dynamic aircraft simulator for the study of human frequency response characteristics, and a discussion of the spectral density approach to perceptual motor tasks.

2359
Akopian, T. A.
[MAN IN COSMIC FLIGHT] Chelovek v kismicheskom polete. — Znanie sila [no place], 1954 (10): 20-21, 1954. In Russian. DLC (T4.Z5, v. 1954)

The writer of this two-page article bears the title of Staff or Crew Physician of the Space Ship "Luna-1", and in a popular but precise and informative way describes the conditions which make life possible as it is known on Earth and the different and adverse conditions to which a living organism will be subjected during an interplanetary flight, including effects of cosmic rays. This is followed by a description of methods and procedures taken to protect the living organism from such adverse effects. Emphasis is placed on the problem of adjusting the proposed space flyers to absolute weightlessness. The coordinated functioning of the human organism is the result of an evolutionary development

over long geological eras under the specific conditions of normal terrestial force of gravity, which vanishes in the course of the space flight. Prospective participants in planned space flights are, therefore, given training to develop an almost reflex type of new coordination to the sense of the weightlessness while going through space. In connection with weightlessness there is the problem of "staying put" in a particular spot of the ship. The supply of breathing air (oxygen), disposal of products of gaseous and other metabolic processes, maintaining the suitable degree of humidity and elimination of excess of moisture, and other phases of life conditions are regulated by automatic installations, so that the crew may be able to comfortably and reliably perform their prescribed assignments relative to the primary purpose of the flight. The space ship is to be equipped with all necessary physiological, meteorological, and physical recording apparatus and will carry experimental animals, guinea pigs, white mice and a dog.

2360
Aksnes, E. G.
EFFECT OF SMALL DOSAGES OF ALCOHOL UPON PERFORMANCE IN A LINK TRAINER. — Jour. Aviation Med., 25 (6) : 680-688, 693. Dec. 1954. DLC (TL555.A1A4, v. 25)

The effects of low body alcohol concentrations were investigated upon 14 experienced pilots flying a U-course in a Link trainer. The use of the most important flying instruments was included as part of the numerical scoring. On each of three days, the subjects were tested after taking 0.2 g., and 0.5 g. per kg. of body weight of alcohol (in 300 cc. orange juice), or a placebo; control flights, were run each day. Compared to the control flights, it was discovered that performance improved after taking the placebo, but that there was a deterioration after taking alcohol. Results seemed to be conclusive when the body concentration of alcohol reached 0.05 per cent; impairment of faculties occurred, however, with as little as 0.02 per cent. It was demonstrated that the mistakes made during the skill tests were the errors which lead to flying accidents. Therefore, it is logical to assume that strict rules for temperance among pilots would cancel out many of these errors. (Author's summary, modified)

2361
Alella, A.
[ARTERIAL OXYGEN SATURATION AND CORONARY CIRCULATION] Arterielle Sauerstoffsättigung und Coronardurchblutung. — Pflügers Archiv für die gesamte Physiologie (Berlin), 259 (5): 422-435. Sept. 1954. In German. DLC (QP1.A63, v. 259)

The effect of anoxia on the coronary vessels was investigated in 28 anesthetized dogs breathing a hypoxic mixture. Within the range of arterial oxygen saturation of 100-45%, the smallest change in saturation which increases the coronary flow is 4.17%. In the case of hypoxemia, the increase in flow rate proceeds simultaneously in both coronary arteries. This increased coronary flow can be explained only partly by changes in aortic blood pressure, in addition there is vasodilatation; neither the heart rate nor exterocardial innervation participates in the vasodilatation. The oxygen saturation in the coronary sinus decreases along with the arterial oxygen saturation. Increase of the arterial oxygen saturation increases the oxygen saturation in the sinus only in the hypoxemia state.

2362
Alella, A.
[RELATION BETWEEN ARTERIAL OXYGEN SATURATION, OXYGEN SATURATION IN THE CORONARY SINUS, AND OXYGEN UTILIZATION IN THE MYOCARDIUM WITH REGARD TO OXYGEN CAPACITY AND ARTERIAL PRESSURE] Beziehungen zwischen arterieller Sauerstoffsättigung, Sauerstoffsättigung im Sinus coronarius und

Sauerstoffausnutzung im Myokard unter Berücksichtigung von Sauerstoffkapazität und arteriellem Druck. – Pflügers Archiv für die gesamte Physiologie (Berlin), 259 (5): 436-453. Sept. 1954. In German.
DLC (QP1.A63, v. 259)

The oxygen saturation in the heart and heart vessels of 36 dogs was determined. At an arterial saturation of 96.6%, the saturation in the coronary sinus is about 21.8 and in the right ventricle 59.5. If the arterial saturation decreases, the saturations in the sinus and the ventricle also decrease and the saturation gradient between ventricle and sinus diminishes. During hypoxemia the oxygen utilization coefficient decreases linearly with the arterial oxygen saturation. If both the arterial oxygen saturation and the oxygen capacity of the blood are varied, the saturation has the greater effect on the utilization coefficient of the myocardium. A nomogram is presented showing the relations between arterial oxygen saturation, oxygen capacity of the blood, and utilization coefficient of the myocardium.

2363
Alexander, C. B. J.
PARA MEDICAL AID. – Aero Med. Soc. Jour. (New Delhi), 1 (1): 50-56. April 1954. DNLM

The development, role, organization, and equipment of a Parachute Medical Team in the Indian Air Force is discussed. A particular parachute medical operation in the hills and jungles of Assam is described. (Author's summary, modified)

2364
Alexander, I. E.,
and T. F. O'Brien
HIGH-TONE STIMULATION AND HEARING LOSS. – Proc. Nat. Acad. Sci. U.S.A., 40 (9): 848-852. Sept. 1954.
DLC (Q11.N26, v. 40)

Specific and localized cochlear lesions were produced in the ears of guinea pigs by use of an intense high-frequency tone (5,000 cycles). Loss in sensitivity for tones between 200 and 10,000 cycles was measured immediately after the injury and after a period of five weeks or more. It was found that hearing loss was uniform and severe for tones between 500 and 5,000 cycles, least severe for the lowest tones, and most severe for tones higher in frequency than the injury-producing tone. The results are discussed with regard to cochlear localization and pitch perception. (Authors' summary)

2365
Allard, A.
[INTRODUCTION TO THE STUDY OF THE PROBLEM OF AGING OF COMMERCIAL PILOTS] Introduction à l'étude du problème du vieillissement des pilotes d'avions commerciaux. – Médecine aéronautique (Paris), 9 (1): 27-31. 1954. In French.
DLC (TL555.M394, v. 9)

The retirement age of pilots should be based on physical as well as psychological factors. At the beginning of aviation, about 30 years ago, athletic, dare-devil type persons were selected as pilots; but the ever increasing complexity of modern engines and instruments does not require dare-devils but prudent and circumspect personalities. While at the beginning of aviation men in their fifties were considered already a serious risk, the increasing security of flying, together with the requirement for a sedate and controlled behavior, have added many useful years to the active life of the pilot. Medical reasons that require the grounding of pilots are cardiac and circulatory deficiencies, kidney insufficiency accompanied by alcoholism, dissolute living habits, hormonal dysequilibrium, metabolic disturbances, and inadequate vision and hearing. Among the psychological reasons which require the termination of the pilot's activity, mention should be made of incapability to get adjusted to modern planes and flying practices and family troubles that disturb the equanimity of the pilot.

2366
Allwood, M. J.,
and H. S. Burry
THE EFFECT OF LOCAL TEMPERATURE ON BLOOD FLOW IN THE HUMAN FOOT. — Jour. Physiol. (London), 124 (2): 345-357. May 1954.
DLC (QP1.J75, v. 124)

The rate of volume blood flow in the foot was measured in four subjects at local temperatures from 15 to 44° C., using the venous occlusion plethysmography technique. The average resting blood flow in the young adult male foot ranged from 0.2 ml./100 ml. tissue/min. at 15° C. to 16.5 ml./100 ml./min. at 44°C. The blood flow was not constant during an experiment, the major variation being an increase with time at temperatures above 32° C., and a decrease below 32° C., returning after an interval towards the initial value. The absolute amplitude of spontaneous variations was greatest at the higher temperatures. The relative amplitude, proportional to the mean flow, was greatest at 29-32° C. The results obtained in these experiments compare favorably with results obtained by other investigators using the hand and foot.

2367
Altland, P. D.,
and B. Highman
EFFECT OF A FOLIC ACID ANTAGONIST (9-METHYL PGA) UPON RATS EXPOSED TO HIGH ALTITUDES. — Amer. Jour. Physiol., 176 (1): 1-5. Jan. 1954. DLC (QP1.A5, v. 176)

Rats were fed 9-methylpteroylglutamic acid and exposed to simulated altitudes of 18,000 and 25,000 ft. 4 hours daily. Evidence of interference with hematopoiesis by the folic acid antagonist was found in the marrow as early as 7 days and in the peripheral blood after 20-40 days. The response to the folic acid antagonist was not selectively altered by altitude exposures known to have a strong erythropoietic stimulus. The polycythemia produced by altitude exposures could be prevented by commencing treatment with the antagonist 22 days prior to the first altitude exposure. When altitude polycythemia was induced before instituting treatment with the antagonist, the polycythemia could be reduced but not completely overcome in most rats before death ensued. (Authors' summary modified)

2368
Altland, P. D.
EFFECT OF HYPOXIA ON TURTLE RETICULOCYTE FORMULA . — Federation Proceedings, 13 (1^{I}): 2. 1954.
DLC (QH301.F37, v. 13)

The development of the reticulocyte is divided into 3 stages on the basis of degree of granulation and size of nucleus and cell. (1) The immature reticulocyte is ovoid (7.2 by 9.0 μ) with scant cytoplasm containing numerous small, but distinct granules. (2) As growth occurs (width 7.2 - 10 μ, length 9.0 - 17.0 μ) the cytoplasm is filled with granules, which occasionally show bipolar clumping. In some cells the nucleus is reduced from an original diameter of 7.2 μ - 3.6 μ. (3) As growth is completed (cell size 9.9 by 19.0 μ), the cytoplasm contains many granules and the diameter of the nucleus is usually reduced to 3.6 μ. The mature erythrocyte retains scattered new methylene blue granules. The technique of Brecher (Am. J. Clin. Path. 19: 895, 1949) was used to demonstrate turtle reticulocytes. The mean reticulocyte formula of 26 adult male turtles was: stage 1, 0.2% ± Standard Error (S.E.) 0.5; stage 2, 0.4% ± S.E. 0.2; stage 3, 0.5% ± S.E. 0.7. — Adult male turtles were exposed to 45,000 ft. simulated altitude 7 hours per day at 20-23°C. The reticulocyte formula of 7 turtles examined after 7 exposures was: stage 1, 0.03% ± S.E. 0.03; 2, 0.3% ± 0.1; and 3, 0.13% ± S.E. 0.04. In 3 turtles exposed 14 times and in 12 exposed 26 times no significant shift in the formula was observed. These findings suggest that hypoxia (pO_2 23 mm. Hg) does not induce reticulocytosis in the turtle. (From the author's summary)

2369
Alzamora, V., 1953
A. Rotta, G. Battilana, R. Abugattas, C. Rubio, J. Bouroncle, C. Zapata, E. Santa-Maria; T. Binder, R. Subiria, D. Paredes, B. Pando, and G. G. Graham
ON THE POSSIBLE INFLUENCE OF GREAT ALTITUDES ON THE DETERMINATION OF CERTAIN CARDIOVASCULAR ANOMALIES. — Pediatrics, 12 (3): 259-262. Sept. 1953
DLC (RJ1.A4533, v. 12)

Over a period of 8 years, 176 cases of cardiac anomalies have been found in over 10,000 consecutive admissions to the Cardiology Clinic, Lima, Peru. The place of birth and its altitude were recorded for each one of these cases. Patent ductus arteriosus and persistent interatrial communications were more likely to be found in patients born at altitudes above 3000 m. It is suggested, but remains to be shown, that this is true for defects of the pulmonary artery. No apparent relation could be found in this series for other malformations. It is presumed that mechanical factors tied to the pulmonary circulation and the lower oxygen tension both have a decisive influence. (Authors' summary modified)

2370
Ambler, R. K.,
and J. T. Bair
A COMPARISON OF REASONS FOR WITHDRAWAL RECORDED BY SPD BOARDS AND BY AVIATION PSYCHOLOGISTS. — In: (Naval School Aviation Med.), 1954. Miscellaneous tests and minor evaluations, p. 8-12. Pensacola, Fla. April 20, 1954. (Project Report no. NM 001 058.25.05).
AD 50 299(b) UNCLASSIFIED

The statements of 61 officer students who voluntarily withdrew from the the training program were analyzed and classified by investigators into the following categories: (1) essential agreement between the statements made to a Student Pilot Disposition (SPD) Board and to the aviation psychologists at the U.S. Naval School of Aviation Medicine; (2) agreement between the statements made to the SPD Board and aviation psychologists, with additional reasons for withdrawal given in the interviews with the aviation psychologists; and (3) complete disagreement or inconsistency between the statements given to the SPD Board and the aviation psychologists. Twenty-one percent fell in the agreement category, 58% were listed in the additional reasons category, and 21% were in the disagreement category. The statements made during the interviews with aviation psychologists were more complete than those reasons recorded by the SPD Boards. (AD abstract)

2371
Ambler, R. K.
THE DISTRIBUTION OF AIRCRAFT ACCIDENTS IN THE NAVAL AVIATION TRAINING PROBLEM: A CONFIRMATION. — In: (Naval School Aviation Med.). Miscellaneous tests and minor evaluations, p. 1-7. Pensacola, Fla., April 20, 1954. (Project Report no. NM 001 058.25.04).
AD 50 299(a) UNCLASSIFIED

The chi-square test was used to test the hypothesis that aircraft accidents are distributed throughout the day according to chance. A tabulation is given of the distribution of actual accidents and the theoretical distribution based on chance expectancy. A chi-square of 7.19 with $P>0.30$ indicates that the differences are due to chance. A chi-square analysis of accident occurrence showed that the hypothesis of chance distribution is tenable. A series of analyses comparing actual and expected accidents for each period vs. the remainder of the day reveals that the number of accidents occurring during the 1030 period differs significantly from chance at the 1% level of confidence. An analysis of "by day of the week" occurrences indicates that the accidents are distributed by chance among the week days. (AD abstract, modified)

2372
Ambler, R. K.,
and J. T. Bair
TWO METHODS OF CLASSIFICATION OF ANXIETY STATEMENTS OF NAVCADS RESIGNING FROM FLIGHT TRAINING. — In: (Naval School Aviation Med.), 1954a. Miscellaneous tests and minor evaluations, p. 1-7. Pensacola, Fla. Oct. 20, 1954. (Project Report no. NM 001 058.25.19). AD 55 782(a)
UNCLASSIFIED

Two investigators reached 99% agreement in the discrete classification of anxiety material obtained from interviews with cadets who resigned from training. With a method of classification which involved analyzing the interviews from the standpoint of weak, moderate, and strong degrees of anxiety, 70% of the subjects were classified exactly the same by both investigators; when the statements were classified into just two categories, weak and strong, analysis showed 90% agreement. Both methods of classification appear to be reliable. At present, the discrete method offers better reliability, but with further refinement, higher reliability could be obtained with the weak-strong method. (AD abstract)

2373
(Amer. Electronics Labs.)
ANOXIA WARNING SYSTEM. — American Electronics Labs., Philadelphia, Pa. (Contract Nonr-808(00), Annual Progress Report no. 5209-4, Serial no. 15, Jan. 1954. 8 p. AD 27 482
PB 115881

The development of an Anoxia Warning System, based on photometric information obtained by transilluminating, or reflecting light from, the subject and using this information electronically has been undertaken. An engineering model of the electronic system has been completed. Efforts up to June 30, 1953 to develop a pickup system suited to service conditions failed because of the inadequacy of available photo-cells. More recent efforts have been concentrated on the study of cadmium sulfide cells to produce a satisfactory pickup. Based on the results using these cells, the decision was made not to undertake a hard tube development program as originally proposed, and to continue work with these cells. (Author's abstract)

2374
Ammons, R. B.
KNOWLEDGE OF PERFORMANCE: SURVEY OF LITERATURE, SOME POSSIBLE APPLICATIONS, AND SUGGESTED EXPERIMENTATION. — Univ. of Louisville, Ky. (Contract AF 33(616)-95); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-14, Feb. 1954. iv+32 p. (RDO 694-44). AD 34 643
PB 137882

A literature survey was made regarding the influence of knowledge of performance on learning, performance, and transfer of training. The results of a large number of studies were organized into 11 generalizations which represent the information currently available in the field of knowledge of performance. Eleven applications are discussed which could be used as a check list in setting up a training situation. Sixteen problems are indicated which are considered as research possibilities. 58 references. (AD abstract)

2375
Ammons, R. B.,
C. H. Ammons, and R. L. Morgan
MOVEMENT ANALYSIS OF THE PERFORMANCE OF A SIMPLE PERCEPTUAL-MOTOR TASK UNDER VARIOUS CONDITIONS. — Univ. of Louisville, Ky. (Contract AF 33(038) - 10196); and Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report 54-36, April 1954. v + 19 p. (RDO no. 694-17). AD 34 306 PB 128428

A study was made of changes in rotary pursuit performance due to duration of practice, introduction of rest

periods, increased accuracy requirements, and increased rate requirements. Motion picture recordings were made, and all movements were classified into 18 categories or types. An evaluation of the results indicated that they could be described simply in terms of changes of the movements from maladaptive and inaccurate to adaptive and accurate. It was proposed that the less effortful the particular conditions of the task, the more nearly performance will approach the optimum, with the less-adaptive movements dropping out. Also, it was suggested that the more effortful erroneous movements drop out more rapidly than the less effortful ones. It was concluded that motion picture recordings are a feasible technique for the analysis of at least rather simple, continuous responses. This technique should be useful in further investigations of skilled performance and in programs which are designed first to find, and then to teach, the optimally effective methods of performing certain continuous tasks. (Authors' abstract)

2376
Ammons, R. B.,
C. H. Ammons, and R. L. Morgan
TRANSFER OF TRAINING IN A SIMPLE MOTOR SKILL ALONG THE SPEED DIMENSION. — Univ. of Louisville, Ky. (Contract AF 33 (038)-10196); and Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-498, March 1954. v+22 p. (RDO no. 694-17). AD 32 537
UNCLASSIFIED

An investigation was made [193 girls between 15 and 19 years old] of the transfer of training between tasks of different speed requirements. The task was rotary pursuit at 4 different speeds. The speeds were assigned to the training and transfer periods in such a manner as to obtain all 16 possible combinations of speeds in the 2 periods. The 16 different combinations of speeds were presented under 3 different conditions of distribution of practice. Findings indicated that (1) the greater the speed of the task, the poorer the performance; (2) the relative rankings among 3 conditions of distribution of practice were not significantly influenced by the rate of the target during either task or the combinations of target rates in the 2 tasks; (3) training tasks at speeds greater than the speed of the final task were less efficient than a training task at the same speed as the final task; and (4) the greater the difference in speed the less the transfer. The limitations of current transfer theories are discussed and attributed to the fact that they are based on research with tasks which do not vary in difficulty when inter-task similarity is manipulated by variations along a single task dimension. The general implications of these findings for the design of training equipment are that the speeds of training tasks should not exceed those for the corresponding operational tasks for which training is intended. (AD abstract)

2377
Amorati, A., 1952
C. Cacciari, and F. M. Troisi
RESEARCH ON CHRONIC TOXIC EFFECTS FROM LONG EXPOSURE TO VAPORS OF PURE GASOLINE. — Indus. Med. and Surg., 21 (10): 466-468. Oct. 1952. DLC (RC963.A37, v. 21)

The authors have examined a group of 39 women employed, most of them for many years, in a factory making rubber sanitary items, and exposed to vapors of a pure gasoline in concentration not causing acute poisoning. Blood examinations revealed hypochronic anemia in a third of the women, and in all the presence of granulocytes with toxic granules of Monsen type, which were in some cases in a high percentage. Other examinations performed (urine, azotemia, alkali reserve, blood glutathione rate, total blood proteins rate, colloid state plasma tests) showed no modifications worthy of note. No skin lesions due to gasoline contact resulted. It is to be concluded that such an exposure to pure

gasoline vapors, continued for a long time, is of no significance as to chronic clinical poisoning. (Authors' summary)

2378

Anastasi, A.,
J. P. Foley, and H. Sackman

PSYCHIATRIC SCREENING OF FLYING PERSONNEL. VI. AN EMPIRICAL EVALUATION OF THE SAM PERSONALITY-SKETCH TEST. — Fordham Univ., New York, and Psychological Corp., New York (Contract AF 18 (600)-4); issued by School of Aviation Medicine, Randolph Field, Tex. April 1954. iii+29+22 p. (Project no. 21-0202-0007, Report no. 6). AD 58 268
PB 116902

Approximately 100 individual scoring elements were developed and applied to the Personality-Sketch Tests of 100 aviation cadets. These subjects included 50 upper and 50 lower criterion cases chosen on the basis of pass-fail status in basic flight training and terminal assessments of adjustment to training. The formulated scoring elements which discriminated between upper and lower criterion groups at the P 0.10 or higher confidence levels were assembled into a preliminary scoring key. Cross-validation of this scoring key in a new sample of 100 pilot cadets, similarly classified into upper and lower criterion groups, was significant at a confidence level between 0.02 and 0.05. A revised scoring key, consisting of 10 scoring elements, was prepared on the basis of the results obtained in the combined sample of 200 cases. All scoring elements which had reached the P 0.20 or higher levels of confidence in the initial validation sample were included in this analysis. It is recommended that the validity of the revised scoring key be determined by cross-validation in new samples. (From the authors' summary)

2379

Anderson, E. H.

AIR TRANSPORTATION OF THE SICK AND INJURED IN CIVIL AIRCRAFT. — Med. Jour. Australia (Sydney), 1 (13): 463-465. March 27, 1954. DNLM

The desirable aspects and limiting factors of transporting sick and injured passengers in aircraft are reviewed. Transportation of patients within Australia is discussed in relation to existing road and air facilities, especially for residents in the outback who depend primarily upon the Flying Doctor Service and air transportation for medical care. Since most patients in Australia are carried in non-pressurized aircraft, selection is centered around the patients' reactions to moderate lack of oxygen, lowered atmospheric pressure, or airsickness. Major Australian domestic airlines require a common form of medical certificate from the patients' physician before the patient is accepted for flight. An example of such a form is included.

2380

Anderson, L. L., 1953
M. L. Willcox, J. Silliman, and S. G. Blount

THE PULMONARY PHYSIOLOGY OF NORMAL INDIVIDUALS LIVING IN AN ALTITUDE OF ONE MILE. — Jour. Clinical Investigation, 32 (6): 490-496. June 1953. DLC (R11.J67, v. 32)

The pulmonary function of a group of healthy, thoroughly acclimatized persons living at altitudes of 5,000 to 8,000 ft. above sea level was evaluated and the results compared with similar studies performed at sea level as reported in the literature. No significant changes were found in the maximum breathing capacity. The average resting minute ventilation at altitude was approximately 43% higher than the normal values for sea level. A 40% increase was registered for minute ventilation and gas exchange after exercise. The arterial and alveolar gas values at altitude were similar to the values at sea level, except for carbon dioxide content and concentration in the peripheral arterial blood which was lower at altitude. Exercise produced a slight increase in the mean values for arterial

oxygen saturation and alveolar tension, suggesting an improvement of alveolar ventilation by the hyperventilation of exercise.

2381
Andreas, B. G.,
R. F. Green, and S. D. S. Spragg
TRANSFER EFFECTS BETWEEN PERFORMANCE ON A FOLLOWING TRACKING TASK (MODIFIED SAM TWO-HAND COORDINATION TEST) AND A COMPENSATORY TRACKING TASK (MODIFIED SAM TWO-HAND PURSUIT TEST). — Jour. Psychol., 37 (2): 173-183. April 1954.
DLC (BF1.J67, v. 37)

The purpose of this experiment was to determine transfer effects between a following tracking task, such as tracing of an aircraft with an open sight anti-aircraft machine gun with both moving in space, and a compensatory tracking task, where the operator adjusts controls to compensate for an apparent drift in a target, bringing it back to a stationary reference point in the display, e.g., operation of a bombsight. A total of 92 basic trainees without previous experience with the apparatus were used as subjects. Subjects, divided into four groups, performed successively on a following tracking task and a compensatory tracking task, the latter being done under "natural" and "unnatural" conditions. Results show that no transfer effects were shown for any combination of tracking performances, with one exception. When compensatory tracking with the "unnatural" display-control relationship was practiced after previous practice on a following tracking, a positive transfer effect was noted.

2382
Andreas, B. G.,
R. F. Green, and S. D. S. Spragg
TRANSFER EFFECTS IN FOLLOWING TRACKING (MODIFIED SAM TWO-HAND COORDINATION TEST) AS A FUNCTION OF REVERSAL OF THE DISPLAY-CONTROL RELATIONSHIPS ON ALTERNATE BLOCKS OF TRIALS. — Jour. Psychol., 37 (2): 185-196. April 1954. DLC (BF1.J67, v. 37)

Six experimental groups, a total of 240 men, were given different patterns of alternation between a "natural" and an "unnatural" condition of following tracking on a modified Two-Hand Coordination Test. When the mean scores achieved on the 9th and 10th trials under the "natural" condition were compared with the appropriate mean from one control group, no effect of alternating practice was observed. However, the comparable "unnatural" mean scores showed an interference effect when compared with their control group. The interference effect was apparently independent of the pattern of alternation. Prior "unnatural" practice on 2, 8, or 16 trials gave the same amount of facilitation on the first "natural" trial. Prior "natural" practice for 1 or 17 trials tended to result in a negative transfer effect on the first "unnatural" trial, whereas the effect was positive facilitation after 4 or 8 "natural" trials. The facilitation effects in all instances were not persistent. Some tentative assumptions regarding the acquisition of specific negative factors and a general positive factor are suggested to account for the results. (Authors' summary)

2383
Applezweig, D. G.,
and M. H. Applezweig
STRESS AND BEHAVIOR: I. THE BEHAVIOR INTERPRETATION INVENTORY. — Connecticut Coll., Dept. of Psychol., New London (Contract Nonr 996 (02)); issued by Office of Naval Research, Washington, D. C., Annual technical report on Motivation Research Project, Aug. 1954. 15 + [13] p. Project NR 172-228. AD 47 108 PB 117886

A systematic study was made on the concept of psychological stress within the framework of a motivational theory. Four basic universal needs were proposed: (1) escape from present pain or

fear, (2) avoidance of future pain or discomfort, (3) social approval or belongingness, and (4) self-realization or creativity. A list of 31 tentative behavior modes serving the need system has been elaborated. Utilizing this model, a multiphasic motivational measure, the Behavior Interpretation Inventory, was constructed as a projective measure, which yields a profile of the relative strengths of the broad needs of the individual. It consists of 124 items, each item containing a short description of a situation involving a mode of behavior and four alternative responses describing reasons for this behavior. The subject chooses the response, which seems most likely to him. Three alternative additional forms of the Inventory were constructed to permit the exploration of the adequacy of the model. Also a new scoring system for TAT [Thermatic Apperception Test] stories were developed utilizing the needs and modes of the present model.

2384
Archer, E. J.
IDENTIFICATION OF TARGET CONCEPTS AS A FUNCTION OF INFORMATION LOAD. — Univ. of Wisconsin, Madison (Contract AF 18(600)-54); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report 54-202, March 1954. iii+9 p. (RDO no. 694-49). AD 35 129
PB 114928

The relationship between the time required to identify a target and the relevance of the target information was studied with 12 groups of 6 subjects each. The groups corresponded to the cells of a 3 x 4 factorial design having one to four bits of relevant information and zero to two bits of irrelevant information which were presented from a single stimulus source at a self-paced rate. The subjects identified oscilloscope patterns by positioning four lever-action switches; they tested their identifications by pressing a push button. The response measure was the time required to identify 32 consecutive patterns. The results indicated that the amount of time required to decode and respond to information increased as a linear function of the amount of relevant information load, but the response time was independent of the amount of irrelevant information presented. Practice improved the speed of pattern identification, but was independent of the amount of information load. (AD abstract)

2385
Archer, E. J.
IDENTIFICATION OF VISUAL PATTERNS AS A FUNCTION OF INFORMATION LOAD. — Jour. Exper. Psychol., 48 (5): 313-317. Nov. 1954.
DLC (BF1.J6, v. 48)

Essentially the same as item no. 2384.

2386
Archer, E. J.,
L. D. Wyckoff, and F. G. Brown
TRACKING PERFORMANCE AS MEASURED BY TIME CONTINUOUSLY ON TARGET. — Univ. of Wisconsin, Madison. (Contract AF 18(600)-54); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-210, March 1954. iv+15 p. (RDO no. 694-49). AD 35 128.
PB 130369

A continuous-time-on-target (CTOT) recorder was employed to obtain direct records of the distributions of duration of hits on the Mast modification of the Pedestal Sight Manipulation Test. The performance was studied of 20 subjects tested over a 5-day period at one of two different target speeds. The CTOT recorder was activated whenever the operator simultaneously scored on azimuth, elevation, and range. The results indicated that as a subject became better practiced on this complex task, the frequency of longer duration hits increased and the frequency of

shorter duration hits decreased; the mode of the frequency distribution of hits shifted to longer durations rather than to a uniform increase in all hit durations. After 5 days of testing, the azimuth, elevation, and range scores had not reached an asymptote. Examination of the frequency distributions of continuous time on target and the influence of practice and target speed on these distributions revealed certain performance characteristics not evident for cumulative time scores. (AD abstract)

2387
Arden, G. B.,
and R. A. Weale
NERVOUS MECHANISMS AND DARK-ADAPTATION. — Jour. Physiol. (London), 125 (3): 417-426. Sept. 28, 1954. DLC (QP1.J75, v. 125)

Dark adaptation curves were measured for two observers. The central fovea and extra-fovea at 8° were examined with white fields subtending at the eye angles of 2.7' and 15' in the former, and 2.7' and 7° in the latter instance. The foveal and extra-foveal absolute thresholds of the fully dark-adapted eye as measured with the 2.7' field were found to be nearly the same. A comparison of the extra-foveal thresholds measured with 2.7' and 7° fields after dark-adaptation lasting 8 and 20 min., respectively, revealed that the integrating power of the retina increased with time. This suggests that part of the adaptive process consists in a change in the size of the receptive field. (Authors' summary)

2388
Arkhangel'skaĭa, N. A.
and A. N. Segal'
[BREATHING REGULATION IN OXYGEN DEFICIENCY] Regulyatsiia dykhaniia v usloviiakh nedostatka kisloroda. — Biŭlleten' eksperimental'noĭ biologii i meditsiny (Moskva), 37 (1): 23. Jan. 1954. In Russian. DLC (R91.B56, v. 37)

Experiments were performed upon 8 white rats. Prior to the development of conditioned hypoxia reflexes, rats were kept under control observation for three days to determine their behavior in the transporting cage and under decompression pressure chamber conditions. Respiratory movements ranged from 23 to 26 per 15 seconds. Following such preliminary observations, each rat was placed three times daily into a decompression chamber for small animals, and the barometric pressure was reduced to the equivalent of 4000 - 5000 m. [original says mm.] above sea level at the rate of 1000 m. per minute. The animals were kept at the condition equivalent to top elevation for 2 - 3 minutes, making a total exposure to reduced barometric pressure of 7 minutes. Respiration counts were made before placing the animal into the barochamber and at points equivalent to 1000, 2000, 3000, 4000 and 5000 m. above sea level. The period of return to normal atmospheric pressure extended over one minute. The results indicate that conditioned reflexes, in the form of increased respiratory rate, developed in white rats under the experimental conditions with comparative ease and on a rather firm basis. Extinction of such reflexes proceeded slowly; generally, the time required for complete extinction equaled the time required for the formation of the conditioned reflexes.

2389
Armstrong, G. E.
MILITARY MEDICINE IN KOREA. — U.S. Armed Forces Med. Jour., 5 (1): 1-7. Jan. 1954. DLC (RC970.U7, v. 5)

The medical problems and tasks the U.S. military forces had to face during the Korean campaign are reviewed, and the evacuation of 60,000 wounded from the combat area by U.S. Air Force and Marine Corps helicopters and fixed wing planes is briefly described. (cf. item 95, vol. 1).

2390
Armstrong, H. C.
AVIATION MEDICINE. — Royal Thai Air Force Med. Gaz. (Bangkok), 3 (4): 295-297. Aug. 1954. In English. DNLM

This paper was read before the Royal Thai Air Force Medical Service's special meeting, which was held during the Thailand tour of the Surgeon General of the United States Air Force. It reviews the most important landmarks in the development and growth of aviation medicine in the United States. The importance of aviation medicine in military and civil aviation in the United States is discussed, particularly in regard to the advances in aviation technology.

2391
Armstrong, H. G.
ACCIDENT PREVENTION IN THE AIR FORCE. — Military Surgeon, 114 (1): 35-36. Jan. 1954. DLC (RD1.A7, V. 114)

Accidents rank first as the major cause of death, of disability retirements, and of non-effectiveness in the U.S. Air Force; they rank second as a cause of hospitalization. Although these accidents stem from a variety of causes, more than half of them have to be attributed to human failure. The size, weight, performance, and complexity of modern aircraft has increased manifoldly the potential hazard of military flying. However, aircraft accident rates, as compared to predictions based on World War I records, have shown a relative decrease. For example, current air fatality rates are only one-fourth, and air accident rates are only one-tenth as high as those experienced 25 years ago. This is an encouraging gain towards the prevention of accidents.

2392
Armstrong, J. G.
R.C.A.F. SURVIVAL FOOD PACKET AFFP-1 TESTS OF CONTAINER. — Defence Research Medical Labs. (Canada), Toronto, Ontario. DRML Report no. 130 (Food Section Publication no. 36), April 1954. ii+7 p. (DRML Project no. 130-35-2-9). AD 36 201
UNCLASSIFIED

Fifty-six packets of the R.C.A.F. Survival Food Packet AFFP-1 were exposed a number of times to reduced pressures and subsequently tested for leaks by immersion in water during exposure to approximately 141 mm. Hg (equivalent to an altitude of 40,000 feet). Initially, 40 packets or 71.5% of the number tested showed no leaks; after 91 exposures to approximately 111 mm. Hg (equivalent to an altitude of 45,000 feet) 27 packets or 48.2% showed no leaks; after 10 additional exposures to approximately 33.6 mm. Hg (equivalent to an altitude of 70,000 feet) 25 packets or 44.6% showed no leaks. Further studies must be conducted with more carefully manufactured containers to determine if the present metal can is potentially a suitable container. The consequences of leakage in the present packet requires immediate attention. (Author's abstract)

2393
Armstrong, J. G.
SOME PRACTICAL COLD CLIMATE FEEDING PROBLEMS IN CANADIAN SERVICE OPERATIONS. — In: Spector, H. and M. S. Peterson (ed.), Nutrition under climatic stress . . , p. 8-12; discussion on p. 15-18, Nat. Acad. of Sci. — Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453
PB 117996

The feeding methods and situations which exist under cold weather conditions are discussed in relation to problems experienced by the three Canadian services in general.

2394
(Army Field Forces)
PARACHUTE DELIVERY OF CASE, MEDICAL FIELD KIT, NONRIGID, NUMBER 5. — Army Field Forces Board No. 1, Fort Bragg, N. C. Feb.

15, 1954. 11 p. (Project no. AB 2753).
AD 30 248 UNCLASSIFIED

The most suitable method for delivering a medical field kit on a parachutist equipped with an individual combat load was determined. The kit is a standard cotton duck case designed for carrying medical equipment and supplies by medical personnel during an air-borne operation. The characteristics of the case, typical medical loads, and suitable methods of attaching and delivering the case were determined. The most suitable method for carrying the kit was by attaching it by two harness attaching straps to rings on the bottom of the combat pack. The combat pack and case would then be attached to the parachute harness by the standard method prescribed for attaching the combat pack. It is recommended that this method be adopted for use by Army Field Forces. (AD abstract)

2395
Arner, O.,
H. Diamant, and L. Goldberg
EFFECTS AND SIDE-EFFECTS OF MOTION SICKNESS PREPARATIONS. — Acta oto-laryngologica (Stockholm), Supplementum 116: 19-23. 1954. In English. DNLM

A study was conducted comparing various motion sickness preparations with respect to their effects and possible side-effects during a winter cruise. The preparations used were: dimenhydrinate, Pentymal and scopolamine hydrobromide, R. P. 3015 (a phenothiazine derivative), R. P. 3015 and scopolamine hydrobromide, dimenhydrinate and scopolamine hydrobromide, lergigan and amphetamine sulphate, and placebo. Due to weather conditions unfavorable to the experiment, no conclusions could be reached regarding possible differences in efficacy between antihistaminics and preparations of the barbiturate-hyoscine type. Tables showing side-effects and their incidence for each type of drug are included.

2396
Arnold, H. 1953
[FLICKER FUSION FREQUENCY AND FATIGUE STRESS] Optische Verschmelzungsfrequenz und ermüdende Beanspruchung. — Arbeitsphysiologie (Berlin), 15 (1): 62-78. 1953. In German. DNLM

Within an illumination range of 3 to 60 lux, the critical flicker frequency is proportional to the log of light intensity and higher in the light-adapted than in the dark-adapted state. Within this range the critical flicker frequency has a high individual constancy, which allows it to be regarded as a personal characteristic of a given subject. However, the flicker fusion point differs within an individual, in that, together with the basal metabolic rate, it increases after orientation practice. Under the influence of various stresses, such as visual stimulation, physical exercise, or mental work, the critical flicker frequency decreases inversely to the degree of subjective tension. However, primary differences were noted in the curves obtained during each of these stresses. Under physical stress the critical flicker frequency may again increase, as a counterreaction sets in. This reaction was not observed in the case of mental stress, where the decrease of critical flicker frequency was almost linear. In visual stress caused by observing flickering light, the critical flicker frequency reaches an asymptotic plateau in spite of continued light stress. The author discusses possibilities for quantitative and qualitative estimates of fatigue in various stresses using the critical flicker frequency as an index.

2397
Arnold, H., 1953
and K. Wachholder
[FURTHER RESEARCH ON CRITICAL FLICKER FREQUENCY AND FATIGUING PHYSICAL STRESS] Weitere Untersuchungen über optische Verschmelzungsfrequenz und ermüdende

körperliche Beanspruchung. — Arbeitsphysiologie (Berlin), 15 (2): 139-148. 1953. In German. DNLM

When dynamic or static physical stress is exerted to the point of extreme fatigue, changes in critical flicker frequency occur in three stages: an initial increase is followed by a decrease which eventually reverts to an increase in the final stage. The duration and extent of these fluctuations may vary considerably from person to person and are also extremely dependent upon the degree of stress in the same individual. The following factors are supposed to be responsible for the increase in critical flicker frequency: excitatory irradiation from motor stimuli, excitatory irradiation in connection with conscious efforts to concentrate, and effects of sympathetic stimulation, e.g., increased release of adrenalin. The decrease in critical flicker frequency may be due to physical fatigue, decrease of concentration resulting from repetition of automatic movements, or braking effect of the parasympathetic system, i.e., release of a vagotonic substance. Due to the complex interaction among these factors, it is impossible to use the CFF as an objective, practical method of measuring fatigue.

2398
Arnould, P.,
and M. Lamarche
[MODIFICATIONS OF THE BLOOD VOLUME AND INTERSTITIAL FLUID VALUES IN THE CHLORALOSED DOG DURING ACUTE ANOXEMIA] Modifications des valeurs de la masse sanguine et des liquides interstitiels chez le chien chloralosé au cours de l'anoxémie aiguë. — Journal de physiologie (Paris), 46 (3): 809-822. 1954. In French. DNLM

During acute anoxemia induced by the inhalation of 10% O_2 in N_2 in chloralosed dogs (intact and splenectomized) there was observed: (1) displacement of body fluids, in the sense of passage of plasma fluid into the interstitial spaces, with no modification of the extracellular spaces, and (2) the phenomenon of hemoconcentration as indicated by the absence of major splenic contraction, an increase in erythrocyte numbers (12.8% increase), and an increase in hemoglobin concentration.

2399
Arnoult, M. D.
SHAPE DISCRIMINATION AS A FUNCTION OF THE ANGULAR ORIENTATION OF THE STIMULI. — Jour. Exper. Psychol., 47 (5): 323-328. May 1954. DLC (BF1.J6, v. 47)

Pairs of two-dimensional nonsense figures were presented tachistoscopically to 256 basic airmen, who were required to judge them for identity of shape. Each shape was rotated to any of eight angular positions, giving an angular separation between shapes in multiples of 30° between 0° and 180°, inclusive. The accuracy and latency of shape discrimination were studied as a function of the angular separation of the shapes. The results indicated: (1) when the two shapes were identical, errors increased as a function of increased angular separation (error range 20% to 40%); (2) when the two shapes were different, errors showed an initial decrease (30° separation), followed by an increase (60° to 150°) and a final drop at 180° (error range 12% to 15%); and (3) latencies on identical shapes were higher than on different shapes, with the changes in latency as a function of angular separation being statistically significant, though irregular. Generalization of these results is limited, since a significant interaction was found between the angular separation and the variable of shape. Nevertheless, these results suggest the following hypotheses concerning certain aviation problems: (a) navigation in flight by means of comparing contours on a map with contours on the ground should be maximally efficient when the map and the ground have the same compass orientation; (b) failure to line up the map and the terrain should lead to more errors

in judging sameness than in judging difference; and (c) the relative frequency of such sameness errors should increase as a function of increasing angular separation between map and terrain. (Author's summary, modified)

2400
Arunachalam, R.
MEDICAL STANDARDS OF FITNESS. — Aero Med. Soc. Jour. (New Delhi), 1 (1): 19-27. April 1954. DNLM

Existing physical standards for pilots in India are critically reviewed. Contrary to some opinions that these standards were primarily intended for the British and are too strict and unsuitable for the average Indian, the author calls for more standardization and greater thoroughness in medical examinations. More attention should be paid to personal case histories with emphasis on diseases prevalent in a tropical climate. Physical fitness should be determined on the basis of muscular strength rather than weight. The vasomotor tests used at present are unsatisfactory; a test involving a change in posture should be adopted. Techniques and conditions under which blood pressure is taken should be rigidly standardized. Even slight hypertension should not be condoned in pilot candidates, although personnel already in service may continue to fly. The self-balancing test should always be performed with shoes on. Candidates with persistent albuminuria or glycosuria should be rejected, as these conditions may indicate chronic nephritis and diabetes, respectively. Routine checks should be made periodically while on duty for color vision, as color blindness can be acquired. Pilots in service with a perforated tympanum may continue to fly. It is suggested that standards should be adjusted to each particular position among the air crew, so as to be consistent with duties performed.

2401
Aschan, G.
RESPONSE TO ROTATORY STIMULI IN FIGHTER PILOTS. — Acta oto-laryngologica (Stockholm), Supplementum 116: 24-31. 1954. In English.
DNLM

One hundred fighter pilots were examined oto-neurologically to determine whether their profession influenced their oto-neurological status. A tangible relation to their actual flying duties can be demonstrated. Fully trained fighter pilots in good trim, with practically daily ascents, show a sensation cupulogram with a higher threshold value and slighter inclination of the sensation cupulogram curve than pilots with less training. Pilots flying to a very limited extent did not differ in any way from the controls consisting of non-aviators, as shown by the nystagmus cupulograms. In these controls directional preponderance was often observed, and in 26 out of 33 cases this corresponded to case histories reporting that the pilots concerned rotate their aircraft more easily and carry out rolls in agreement with directional preponderance. An absence from flying duty for a longer period results in normalization of this status. Significant oto-neurological changes in the calorigrams could not be demonstrated, except in a few cases. These have been accounted for separately, since unmistakable oto-neurological diagnoses were involved. In discussing the results, it is maintained that the genesis of this vestibular fatigue must be sought in the neural part of the vestibular apparatus rather than peripherally in the cupula itself. (Author's summary, modified)

2402
Aschoff, J. 1952
[ACTIVITY RHYTHM OF MICE IN CONSTANT DARKNESS] Aktivitätsperiodik von Mäusen im Dauerdunkel. — Pflügers Archiv für die gesamte Physiologie (Berlin), 255 (3): 189-196. June 1952. In German.
DLC (QP1.A63, v. 255)

Total locomotor activity of albino mice follows a basic rhythm of approx-

imately 10 short activity periods within 24 hours. An evening peak of maximal activity is followed approximately 12 hours later by a lesser peak of activity. Under normal day-night conditions the peak of maximum activity takes place regularly at the same time every day. The period length is 24±2.5 hours. In mice kept in constant darkness with all external time referents excluded, the biological clock deviates by a certain fraction from the terrestrial day-night cycle. The period length changes to 23-23.5 hours.

2403
Aschoff, J. 1952
[FREQUENCY CHANGES OF THE ACTIVITY RHYTHM OF MICE IN CONSTANT ILLUMINATION AND CONSTANT DARKNESS] Frequenzänderungen der Aktivitätsperiodik bei Mäusen im Dauerlicht und Dauerdunkel. — Pflügers Archiv für die gesamte Physiologie (Berlin), 255 (3): 196-203. June 1952. In German.

DLC (QP1.A63, v. 255)

The normal 24-hour activity cycle of albino mice kept under constant illumination is lengthened to 26 hours depending upon the light intensity used. A transfer to constant darkness shortens the biological clock to a period length of less than 24 hours, which is particular for this animal. This cycle persists at approximately the same period length even if the animals stay for months in constant darkness.

2404
Åstrand, P. O.,
and I. Ryhming
A NOMOGRAM FOR CALCULATION OF AEROBIC CAPACITY (PHYSICAL FITNESS) FROM PULSE RATE DURING SUBMAXIMAL WORK. — Jour. Applied Physiol., 7 (2): 218-221. Sept. 1954. DLC (QP1.J72, v. 7)

A nomogram is presented where an individual's maximal attainable oxygen intake (aerobic capacity) can be calculated from the heart rate and oxygen intake (or work level) reached during a test with a submaximal rate of work. As test work a step test, treadmill test or cycle test can be chosen. It is suggested that the individual's aerobic capacity per kilogram body weight per minute will give a good measure of his physical fitness. Values for healthy, well-trained men and women 20-30 years of age are presented. (Authors' summary)

2405
Åstrand, P. O.
THE RESPIRATORY ACTIVITY IN MAN EXPOSED TO PROLONGED HYPOXIA. — Acta physiologica scandinavica (Stockholm), 30 (4): 342-367. 1954. DNLM

Two healthy subjects were exposed to simulated altitude in a low pressure chamber for 66 to 115 hours (3,000 or 4,000 m.). On one subject determinations of pulmonary ventilation and alveolar pCO_2 etc. were done prior to, during, and after the period of acclimatization to hypoxia. The experiments comprised rest conditions and periods of work of varying grades of severity. On both subjects the respiratory response to CO_2 mixtures was tested. By breathing oxygen the hypoxic "drive" from the chemoreceptors was blocked and the effect on the ventilation was examined. The results indicated that: (1) the hypoxic "drive" occurring during acclimatization remained constant and of the same value as that seen in acute hypoxia; (2) breathing air or oxygen the pulmonary ventilation at any work level during prolonged exposure exceeded that seen in comparable experiments during acute exposure to altitude; (3) following the period of prolonged hypoxia the respiration was much more sensitive to CO_2 than was the case prior to the exposure to altitude. The effect of $CO_2 + O_2$ was more pronounced than that of CO_2+air. (Author's summary)

2406
Åstrand, P. O.

A STUDY OF CHEMORECEPTOR ACTIVITY IN ANIMALS EXPOSED TO PROLONGED HYPOXIA. — Acta physiologica scandinavica (Stockholm), 30 (4): 335-342. 1954. DNLM

Evidence of marked chemoreceptor activity has been found in cats which have been subjected to sustained hypoxia (4,000 m. simulated altitude, tracheal pO_2 = 87 mm.) for periods up to 64 hours. Such animals all showed a reduction of their chemoreceptor activity when the inspired oxygen tension was increased. In addition, their pulmonary ventilation was markedly reduced, presumably as a consequence of the lessening of chemoreceptor impulse traffic so achieved. The reduction in pulmonary ventilation was associated with a rise of alveolar CO_2 tension. This increase of alveolar CO_2 must partially compensate for the reduction of the chemoreceptor and will secondarily increase the centrogenic drive of the respiratory center. Contradictory results obtained by others are discussed in relation to the present experiment. (Author's summary, modified)

2407
Atkinson, C. J.

FOUR STUDIES OF SIDETONE. — State Univ. of Iowa, Iowa City. Supplementary Report no. 5, Oct. 15, 1954. [37]p. (Contract DA 36-039-sc-42562). AD-49 846 UNCLASSIFIED

The papers in this report are abstracted separately as items no. 2408, 2409, 2410, and 2411.

2408
Atkinson, C. J.

EFFECTS OF SOME LISTENING CONDITIONS ON THE DURATION AND SOUND PRESSURE OF SPEECH. In his: Four Studies of Sidetone, p. 18-23. State Univ. of Iowa, Iowa City. Supplementary Report no. 5, Oct. 15, 1954. (Contract DA 36-039-sc-42562). AD-49 846 UNCLASSIFIED

Duration of speech is only slightly affected by whether sidetone is heard by any of the listening conditions (one live earphone — one ear uncovered; one live — one dummy earphone; two live earphones; tested in 3 noise levels) of this experiment. It appears that rate of speech is highly resistant to changes in the ambient noise levels and listening conditions as well as being relatively constant from day to day. Sound pressure of speech is more readily affected by sidetone changes than is rate. Again, however, aside from getting louder as the ambient noise level increases, the sound pressure level of speech for a group is very stable for the listening conditions tested. (Author's summary)

2409
Atkinson, C. J.

INTELLIGIBILITY AS AFFECTED BY CHANGES IN THE PHASE, SPECTRUM AND LEVEL OF THE SIDETONE OF A TALKER. In his: Four Studies of Sidetone, p. 24-32a. State Univ. of Iowa, Iowa City. Supplementary Report no. 5, Oct. 15, 1954. (Contract DA 36-039-sc-42562). AD-49 846 UNCLASSIFIED

Three kinds of changes were introduced in the sidetone of talkers. The intelligibility of these talkers was measured under each combination of sidetone conditions. The changes were phase between earphones (0 or 180 degrees), spectrum (band pass filters of 250-795, 795-1515, 1515-2355, 2355-3680, 3680-7000 c.p.s.) and level of sidetone (set by a limiter - attenuator combination). No large differences in the mean intelligibility measures appeared to be associated with any of these changes in the sidetone of the talkers. An analysis of variance of the measures showed no factor, or combination of factors, to be significant in the effect they produced on the intelligibility of a talker. The lack of positive findings with respect to the individual factors of phase, spectrum, and level of sidetone were discussed. (Author's summary)

2410
Atkinson, C. J.
SOME ASPECTS OF ADAPTATION TO DELAYED SIDETONE. In his: Four Studies of Sidetone, p. 1-9a. State Univ. of Iowa, Iowa City. Supplementary Report no. 5, Oct. 15, 1954. (Contract DA 36-039-sc-42562). AD-49 846
UNCLASSIFIED

A study was conducted to test the hypothesis that adaptation would not be established in either the duration or relative sound pressure of speech while the talker heard delayed side tone. Speech generally became faster (more nearly normal) after more practice with a given sidetone delay. The hypothesis of no adaptation was rejected for days but not rejected for hours. Duration and sound pressure measures with undelayed sidetone before practice each hour and at the end of practice each hour, were also taken. The duration measures taken before practice were slightly greater than measures taken after delayed sidetone practice for one group; the differences were in the opposite direction for the other group. The relative sound pressure for the before-practice measures were nearly balanced for magnitude and direction of differences; none of the differences were significant. (Author's summary)

2411
Atkinson, C. J.
SOME EFFECTS ON INTELLIGIBILITY WHEN THE SIDETONE LEVEL AND SIDETONE DELAY ARE CHANGED. In his: Four Studies of Sidetone, p. 10-17a. State Univ. of Iowa, Iowa City. Supplementary Report no. 5, Oct. 15, 1954. (Contract DA 36-039-sc-42562). AD-49 846
UNCLASSIFIED

A study of the effects of several combinations of sidetone level and sidetone delay is reported. The combinations consist of three levels of amplification of sidetone each tested against eleven delays of sidetone. Level of sidetone is shown to be effective on talker intelligibility by producing relatively more intelligibility for less level of sidetone, a result to be predicted from previous research. Delay of sidetone is also shown to affect intelligibility; the manner in which the delays affected intelligibility is not predictable, nor was it possible to see a pattern for the effects of delay on intelligibility. There appears to be a tendency for the more intelligible of the talkers in this study to be less affected by sidetone level than the less intelligible talkers in this study. (Author's summary)

2412
Auerbach, E.,
and G. Wald
IDENTIFICATION OF A VIOLET RECEPTOR IN HUMAN COLOR VISION. — Science, 120 (3115): 401-405. Sept. 10, 1954. DLC (Q1.S35, v. 120)

The present experiments involve measurements of dark adaptation, which reveal the presence in the human retina of a species of cone selectively sensitive to violet light, the excitation of which induces a violet sensation. The procedure is to adapt the eye very strongly with red, orange, or yellow light, which spares the violet receptor, and then to measure its dark adaptation with test lights of low wavelengths. The results indicate that the first 2 or 3 minutes of dark adaptation are occupied with a receptor with maximal sensitivity in the neighborhood of 436μ. (Authors' summary)

2413
Aviado, D. M.
J. S. Ling, C. W. Quimby, and C. F. Schmidt
ADDITIONAL ROLE OF REFLEX PULMONARY VASOCONSTRICTION DURING ANOXIA. — Federation Proceedings, 13 (1[I]): 4-5. 1954.
DLC (QH301.F37, v. 13)

Experiments recently completed have demonstrated that the anoxic excitation of carotid and aortic body chemoreceptors causes pulmonary hypertension not only by increasing cardiac output but also by pulmonary

vasoconstriction. A lobe of one lung of the experimental dog (that is perfused at a constant flow with blood from a living donor dog) showed a hypertensive response to anoxia of the experimental dog as long as the chemoreceptor innervation and the sympathetic nerve supply to the lobe were intact. The latter was interrupted by excision of the upper 5 thoracic sympathetic ganglia and by cannulation of the pulmonary artery extrapericardially but not by intrapericardial cannulation of the pulmonary vessels. Even with innervation demonstrably intact, perfusion with blood of lower oxygen content caused pure vasodilation in the perfused lobe. After sympathetic denervation the vessels of the perfused lobe could still respond to local vasoconstrictors like alloxan and epinephrine, and to local dilators like ventilation of the lobe with 5% oxygen. (From the authors' summary)

2414

Aviation Med. Accel. Lab.

ACCOMPLISHMENT SUMMARY OF AVIATION MEDICAL ACCELERATION LABORATORY. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. [1954] 32 p. AD 52 476 UNCLASSIFIED

A brief account is given of the various studies in aviation medicine undertaken at the Aviation Medical Acceleration Laboratory. A 50-ft. centrifuge was employed in studying human tolerance to acceleration. An acceleration chart was prepared summarizing the type of acceleration, direction of body movement, aircraft maneuver, and maximum human and animal exposures. Other studies involved the simulation of uncontrolled aircraft, the evaluation of acceleration-protective devices, and the effect of simulated high-altitude, high-velocity, or high-performance flying on various physiological, biochemical, psychophysical, and pathological conditions. Consideration was given to the use of X-ray motion pictures in studying circulatory and visceral movements under acceleration stress. (AD abstract)

2415

Bach, L. M. N.,
and C. J. Sperry

STUDIES ON THE EFFECTS OF FLICKERING LIGHT ON HUMAN SUBJECTS. — Tulane Univ. Dept. of Physiology, New Orleans, La. Second Technical Report (April 1 - July 1, 1954), July 15, 1954. 4 p. (Contract DA-44-009 ENG-775) AD-54 215 UNCLASSIFIED

Fixed frequencies of light sources of high intensity failed to produce significant subjective disorientation or hallucinations in 12 subjects which could be accounted for by the high intensity of the source. It was found that moving objects might cause giddiness in some subjects exposed to flickering light. It is now planned to proceed with the original procedure of triggering the flicker source with dominant frequencies of the electroencephalographic recordings of the subjects. No effect due to use of red light rather than white light was at all obvious. (Authors' conclusions)

2416

Baer, C. A.,
and R. B. Lawrence

RADIATION REFLECTING FABRICS FOR FLASH AND FIRE PROTECTIVE CLOTHING. — National Research Corp., Cambridge, Mass. (Contract AF 33(038)-12483); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-376, Oct. 1953. 130 p. (RDO no. R-666-351). AD-23 964 UNCLASSIFIED

The research effort to develop two distinct types of radiation reflecting fabrics to provide fire protection in aircrew and special purpose clothing is presented. Various phases of the program to produce permeable and impermeable infrared reflecting fabrics are described. Selection of the

method of metal disposition for yarn and fabrics and the development of methods for obtaining adherent functional coatings together with the measurement of the radiation performance of the resultant coated fabric are discussed. Methods of evaluation and the test results obtained are given for air and water permeability, effect of various test fluids, resistance to laundering and dry cleaning, abrasion resistance and the effect of protective over coatings. Development of metallized yarns proved unsatisfactory as it was found more practical to produce a reflective coating on the woven fabric. A successful impermeable fabric was developed which is considered to have useful durability, washability and wear resistance, as well as good radiation reflecting properties. A successful permeable reflective fabric was not achieved. (Authors' abstract)

2417

Bahn, R. C.,
and D. Glick

STUDIES IN HISTOCHEMISTRY: EFFECTS OF STRESS CONDITIONS, ACTH, CORTISONE AND DESOXYCORTICOSTERONE ON THE QUANTITATIVE HISTOLOGICAL DISTRIBUTION OF ASCORBIC ACID IN ADRENAL GLANDS OF THE RAT AND MONKEY. — Endocrinol., 54 (6): 672-684. June 1954.

DLC(QP187.A25, v. 54)

The quantitative histological distribution of adrenal ascorbic acid was studied in rats and monkeys following treatments with ACTH, cortisone, or desoxycorticosterone, or exposure to the stress conditions of chilling, violent struggling, ether anesthesia, and combined hypoxia and hyperthermia. All of the stress conditions caused a decrease in the concentration of ascorbic acid, chiefly in the outer fascicular and reticular zones. In both rats and monkeys the responses to intraperitoneal injections of ACTH were qualitatively similar to those effected to stress conditions. In rats the decrease of adrenal ascorbic acid after ACTH injections was comparable to that caused by cold exposure (2°C.) for one hour, while in monkeys the loss of adrenal ascorbic acid after ACTH was less than that caused by stress conditions. Little change was observed in the concentration of adrenal ascorbic acid of rats after a single injection of desoxycorticosterone acetate. However, chronic administration of this hormone resulted in a small decrease in the concentration of ascorbic acid in the outer fasciculata. A single injection of cortisone acetate effected moderate decreases in adrenal ascorbic acid in both rats and monkeys. A chronic administration of the same hormone produced distinct decreases in ascorbic acid concentrations in the outer fascicular and reticular zones. When the rat was given a single subcutaneous dose 24 hours before exposure to cold (2°C.) for one hour, both cortisone acetate and desoxycorticosterone acetate inhibited the losses of ascorbic acid. Little or no dehydroascorbic and diketogulonic acids were found in any of the zones of the adrenal from normal rats or those exposed to cold or forced to struggle violently. (Authors' summary, modified)

2418

Bahnson, H. T., 1953
and C. M. Matthews

BLOOD AND TISSUE GASES OF ANIMALS EXPOSED TO ONE AND SEVEN ATMOSPHERES OF OXYGEN OR AIR. — Amer. Jour. Physiol., 175 (1): 87-92. Oct. 1953.

DLC (QP1.A5, v. 175)

Rabbits, which had air or nitrogen injected into the peritoneal cavity, were exposed to an atmosphere of 98-100% oxygen for an extended period of time. There was no significant change in tissue oxygen and CO_2 tensions, as reflected in the "abdominal bubble", for the first 40-60 hours. Subsequently they showed signs of increased respiratory effort which became more prominent until death. Autopsy revealed pulmonary damage. The remainder of

the paper deals with reactions of rats to oxygen at 7 atmospheres pressure.

2419
Baier, G. W.
and R. A. Solow
PSYCHIATRIC WARD PERSONNEL: THEIR RELATION WITH AIR-EVACUATED PSYCHOTIC PATIENTS. — Military Surgeon, 114 (6): 458-459. June 1954. (DLC (RD1.A7, v. 114)

The unique relationship between psychiatric ward personnel and psychotic patients being evacuated as psychiatric casualties from the Far East Theatre of Operations is presented. The unusual problems of the ward as the patient's first contact with "home," air evacuation techniques, and the short stay prior to definite hospitalization are discussed. The handling of the patients' questions and requests involve a relationship which is different from that on other psychiatric wards. The relationship in a transit psychiatric ward is and must be therapeutic to allow the patient's brief stay to be a favorable adjunct in his over-all therapy. (Authors' summary)

2420
Bailey, W. B.
KEEP UP WITH YOUR AIRPLANE. — Combat Crew, 5 (6): 11. Dec. 1954.
DLC

Practical solutions to problems frequently encountered in the flying of modern aircraft, including anoxia, middle-ear pressure, abdominal gas expansion at high altitude, and g forces, are discussed. A brief explanation of each phenomenon is presented.

2421
Bair, J. T.,
and R. K. Ambler
ATTRITION DATA AS A CRITERION: II. ATTITUDES OF FLIGHT FAILURES TOWARD LEAVING TRAINING. – In: (Naval School Aviation Med.), Miscellaneous tests and minor evaluations, p. 8-13. Pensacola, Fla. Oct. 20, 1954. (Project Report no. NM 001 058.25.20). AD 55 782(b) UNCLASSIFIED

The recorded statements of Naval Aviation cadets who failed Basic Flight Training were analyzed for attitudes associated with their flight failure. A comparison of the interview content of the flight failures in the highest and in the lowest quartiles revealed that the cadet flight failure population was a more homogeneous group with respect to flight aptitude, flight proficiency, and attitudes toward leaving the program than a previously studied group (cf. this vol., item 3608) that voluntarily resigned from training. (AD abstract)

2422
Bair, J. T.,
R. F. Lochman, and C. T. Martoccia
A FACTOR ANALYSIS OF PREDICTOR AND CRITERION VARIABLES FOR THE NAVAL AIR TRAINING PROGRAM. — Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 057.13.01). Dec. 14, 1954. 16 p. AD 61 456
UNCLASSIFIED

It was the purpose of this research to interrelate certain tests of spatial and perceptual abilities, tests of other differential abilities, and proficiency measures in the Naval Air Training Program, and to obtain information concerning the factorial structure of spatial and perceptual abilities. It was found that: (1) the most substantial relationships existed between tests of academic aptitude and grades in the U. S. Naval School, Pre-Flight; (2) spatial ability tests correlated highest with final basic and advanced flight training grades; and (3) four significant factors were derived by factor analysis — perceptual, academic achievement, comprehension of relationships, and applied spatial relations. It was recommended that: (1) certain differential ability tests should be considered as supplementary determiners of the progress grade; (2) a

spatial relations type test should be included in the Navy Flight Aptitude Rating battery; and (3) criterion variables should be included in the correlation matrix for factor analysis since they can aid in the description and interpretation of the factors derived. (Authors' abstract, modified)

2423
Bair, J. T.
A SHORT ATTITUDE SCALE AND ITS RELATION TO MOTIVATION IN THE NAVAL AIR TRAINING PROGRAM. — In: (Naval School Aviation Med.), 1954. Miscellaneous tests and minor evaluations, p. 13-17. Pensacola, Fla. April 20, 1954. (Project Report no. NM 001 058.25.06). AD 50 299(c)
UNCLASSIFIED

A short form of the authoritarian-equalitarian scale (cf. Sanford, F. H., and Older, H. J., Institute for Research in Human Relations, Rept. X10-6, June 1950) was used in the experiment, in addition to items tapping certain personal and social values. These tests were given to 85 cadets who had completed the basic phase of their flight training and the 100 cadets who voluntarily withdrew during the same periods. Measurable differences in attitudes which are related to authoritarianism and certain personal and social values appeared to exist between the cadets who withdrew and those who remained in training. (AD abstract)

2424
Bajog, M.
[AN EAR AND SOUND PROTECTOR APPARATUS] Ein Ohrschutz-, Geräusch- u. Lärmschutzgerät. — Archiv für Ohren- Nasen- und Kehlkopfheilkunde (Berlin), 165 (2-6): 474-475. 1954. In German. DNLM

An apparatus consisting of an inflatable bladder with bellows, designed for airtight protection of the ear and for diminution of noise, is described. The device is easily inserted by the wearer into the auditory canal. An intratracheal catheter and nose, throat, and secondary nasal cavity protectors have been similarly developed.

2425
Baker, C. A.
INTERPOLATION ACCURACY AS A FUNCTION OF VISUAL ANGLE BETWEEN SCALE MARKS. — Jour. Exper. Psychol., 47 (6): 433-436. June 1954 DLC (BF1.J6, v. 47)

The accuracy of interpolation of the position of a target between two concentric circles (range rings) was investigated as a function of the range ring separations of 1/4, 1/2, 1, 2, and 4 in. and viewing distances of 10, 15, 20, 30, and 40 in. The visual angles subtended by the range rings were from 22' to 22°38'. Error of interpolation (in percentage of the range ring interval) was invariant for the range rings used. The average error for all subjects was 3.6% of the range ring interval. The constant errors of interpolation were positive, and the magnitudes of these errors varied inversely with the radial distance of the target from the center of the display. (Author's summary)

2426
Baker, C. A.,
and W. F. Grether
VISUAL PRESENTATION OF INFORMATION. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-160, Aug. 1954. v+111 p. (Project no. 7180). AD 43 064
UNCLASSIFIED

A compilation of general human engineering recommendations is presented together with supporting data for providing satisfactory visual presentations of information. The data are discussed under the following headings: (1) mechanical indicators, (2) warning devices, (3) cathode-ray tubes and signal coding, (4) printed materials, (5) instrument panel layout, (6) lighting, and (7) visual detection and identification. (AD abstract)

2427
Baldi, G.,
and R. Ricciardi-Pollini
[OCCUPATIONAL PATHOLOGY OF PETROLEUM ETHER AND OF GASOLINE] Patologia professionale da etere di petrolio e da benzina. — Rassegna di medicina industriale (Roma), 23 (2): 77-94. March-April 1954. In Italian. DNLM

A comprehensive discussion is presented on occupational petroleum benzine and gasoline poisoning, including a brief review of experimental research. The pathogenesis, metabolism, pathology, prognosis and diagnosis, therapy, and prevention of acute and chronic poisoning are described. In addition, legislation for the protection of workers in industries utilizing petroleum benzine and benzene is mentioned.

2428
Balducci, D.,
and L. Mongia
[VACCINATION AGAINST INFLUENZA] La vaccinazione contro l'influenza. — Rivista di medicina aeronautica (Roma), 17 (2-3): 178-185. April-Sept. 1954. In Italian, with English summary (p. 183). DLC (TL555.A1R5, v. 17)

Ninety-four men of the Italian Air Force were inoculated with influenza vaccine prepared according to the Salk method, the composition being 22% virus A, 44% virus A_1, and 34% virus B. The men were divided into three groups: one group was injected intramuscularly with 0.25 cc. of vaccine with a virus concentration to produce agglutination of blood serum at a dilution of 1 to 500; a second group received two inoculations at the same titer; and the last group received an inoculation at a dilution of 1:5000. No secondary symptoms of a general or local nature were observed. The antibody rate in the blood serum tested 60 days after the vaccination, showed a remarkable increase, which was greater after the double inoculation and particularly for the antivirus A_1.

2429
Balke, B.
CONTINUOUS DETERMINATION OF NITROGEN CONCENTRATIONS DURING THE RESPIRATORY CYCLE. — School of Aviation Medicine, Randolph Field, Tex., June 1954. 7 p. (Project no. 21-1201-0014, Report no. 5). AD 41 502 PB 115 442

After exclusion of water vapor and carbon dioxide effects upon nitrogen measurements, taken with a Lilly-Anderson nitrogen meter, the changes in nitrogen concentration during the respiratory cycle were recorded continuously while breathing ambient air or oxygen at rest or at exercise. Breathing ambient air, the tracing patterns obtained were a good indicator for the existence of a metabolic or respiratory "steady" or "unsteady state". Breathing oxygen the method permits an accurate segregation and determination of the pulmonary nitrogen elimination and the nitrogen elimination from the blood and tissue. Furthermore it allows for determinations of residual lung volume and of circulatory minute volume during exercise. (Author's summary)

2430
Balke, B.
DETERMINATION OF PULMONARY BLOOD FLOW DURING WORK BY GASEOUS NITROGEN ELIMINATION METHOD. — Federation Proceedings, 13 (1^{I}): 6. 1954 DLC (QH301.F37, v. 13)

The Lilly-Anderson nitrogen meter allows for rapid and sensitive recording of changes in nitrogen concentrations during the respiratory cycle. The pulmonary nitrogen wash-out, while breathing oxygen, was calculated breath by breath from the alveolar nitrogen concentrations and the expiratory alveolar tidal volume. From this total amount of nitrogen was subtracted the nitrogen present in the residual air volume in order to get the amount of nitrogen eliminated from the blood during the pulmonary wash-out period.

The residual air volume was determined from the nitrogen concentrations before and after the first breath of oxygen of known tidal volume. The arteriovenous difference per liter blood can be calculated breath by breath for the pulmonary nitrogen wash-out period. The quotient of the total amount of nitrogen eliminated from the blood divided by the average value of nitrogen eliminated from 1 liter of blood represents the pulmonary blood flow during the pulmonary nitrogen wash-out period. Using this method of determining cardiac output, experiments were run on the treadmill at different workload levels. The circulatory minute volume increased from 13 l. at relatively light work with an oxygen intake of 1300 cc/min. to 42 l. at hard exercise with an oxygen intake of 3400 cc/min. (From the author's summary)

2431
Balke, B.

GAS EXCHANGE AND CARDIOVASCULAR FUNCTIONS AT REST AND IN EXERCISE UNDER THE EFFECTS OF EXTRINSIC AND INTRINSIC FATIGUE FACTORS. B. THE INFLUENCE OF PHYSICAL FATIGUE UPON WORK CAPACITY. – School of Aviation Medicine, Randolph Field, Tex. Feb. 1954. 17 p. (Project no. 21-1201-0014, Report no. 2.). AD 30 206 PB 114056

"Optimal work capacity" (defined as that work capacity which complies with optimal physiological adaptations to work) was determined during exercise on the treadmill; physical fatigue of various degrees was induced by steady-state work on the treadmill over a given time period at increasing workload levels. After a resting period, work capacity was tested again. The following effects were observed: (1) pulse frequency increased at a steady rate during exercise; (2) systolic pressure rose at a diminishing rate; (3) diastolic pressure remained unchanged; (4) the increase in pulmonary ventilation exceeded that in oxygen consumption (decrease in ventilatory efficiency); (5) respiratory rate and tidal volume increased; however, in terms of absolute values, the latter lagged behind control values; and (6) loss of work capacity in the second test progressed more rapidly the closer values of optimal work capacity of the first test were approached.

2432
Balke, B.

[MAXIMUM PHYSICAL EFFICIENCY, ITS MEASUREMENT AND CHANGES AS A RESULT OF FATIGUE] Optimale körperliche Leistungsfähigkeit, ihre Messung und Veränderung infolge Arbeitsermüdung. – Arbeitsphysiologie (Berlin), 15 (4): 311-322. 1954. In German. DNLM

A method is described for measurement of maximum physical efficiency in which physiological adaptation processes are carried to a maximum by periodic increases in the difficulty of work. Criteria used for direct evaluation of work efficiency are pulse rate and blood pressure during work performance. For a final evaluation the values of oxygen uptake, CO_2 excretion and ventilation are included. The limit of maximum work performance usually coincides with the appearance of a pulse rate of 180/min. It is suggested that this may be used as the only criterion for mass testing purposes. This test was used in experiments which measured the influence of fatigue from previous work on the physical work efficiency. In such a case, the difficulty of previous work determines the degree of fatigue, which manifests itself in corresponding decrease of performance. Fatigue affected primarily the pulse rate and blood pressure, secondarily, the oxygen transport and pulmonary ventilation.

2433
Balke, B.

RATE OF GASEOUS NITROGEN ELIMINATION DURING REST AND WORK IN RELATION TO THE OCCURRENCE

OF DECOMPRESSION SICKNESS AT HIGH ALTITUDE. — School of Aviation Medicine, Randolph Field, Tex. Oct. 1954. 6 p. (Project no. 21-1201-0014, Report no. 6). AD 57 940
PB116237

Mild and severe exercise on the treadmill, with subjects breathing ambient air, did not increase the susceptibility for decompression sickness during subsequent ascents to high altitude. On the contrary, there was a very slight trend toward an improved tolerance for high-altitude pains. Nitrogen elimination experiments on one subject at rest and at various levels of exercise were carried out. On the average, (in seven subjects) 640 cc. of tissue nitrogen were eliminated during 60 minutes of rest, 1,580 cc. during 60 minutes of exercise on the treadmill at 2% grade, and 1,050 cc. during 30 minutes of exercise at 5% inclination of the treadmill. In all instances the accumulated nitrogen elimination from blood and tissue, showed an approximately straight-line relationship. — In another experiment, it was noted that 60 minutes of preoxygenation during rest with a measured nitrogen loss of 640 cc. had practically the same effect as 30 minutes of denitrogenation with 400 cc. of nitrogen given off by the blood tissues. Two hours of preoxygenation at sitting rest almost doubled the tolerance time. When oxygen breathing was continued during exercise for a period of 60 minutes, the same beneficial effect was obtained as after two hours of resting preoxygenation. (From the author's results)

2434
Balogh, L., 1952
G. Donhoffer, G. Mestyán, T. Pap, and I. Tóth

THE EFFECT OF ENVIRONMENTAL TEMPERATURE ON THE O_2-CONSUMPTION AND BODY TEMPERATURE OF RATS UNDER THE ACUTE ACTION OF SOME DRUGS AFFECTING ENERGY EXCHANGE AND BODY TEMPERATURE. — Acta physiologica (Budapest), 3 (2): 367-375. 1952. In English. DNLM

Aminothiazole, methylthiouracil, methylsulphathiazole, or Pyramidon administered to rats exposed to cold caused a decrease in body temperature and O_2 consumption. Reduction of the environmental temperature from 29° C. to 21° C. failed to increase the rate of O_2 consumption, whereas an increase of ambient temperature from 29° C. to 35° C. under the same conditions was followed by a normal rise in O_2 consumption. (Authors' summary, modified)

2435
Balogh, L., 1952
S. Donhoffer, G. Mestyán, T. Pap, and I. Tóth

THE RESPONSE OF O_2-CONSUMPTION OF THE THYROIDECTOMIZED, HYPOPHYSECTOMIZED AND METHYLTHIOURACIL TREATED RATS TO HIGH ENVIRONMENTAL TEMPERATURES AND THE ACTION OF THYROXINE THEREON. — Acta physiologica (Budapest), 3 (2): 395-403. 1952. In English. DNLM

An environmental temperature of 35° C. induces a marked increase of O_2 consumption in the normal rat, but this response does not appear at this, or even higher temperatures, in thyroidectomized, hypophysectomized, or methylthiouracil-treated rats. The failure of these rats to respond to high environmental temperatures can not be attributed to differences of body temperature, for hyperthermia may exceed the level at which a rise of metabolic rate is elicited without exception in the normal rat, and O_2 consumption is either unchanged or declines. The normal response may be restored by the administration of thyroxine in small doses. It is concluded that thyroxin deficiency is the factor responsible for the failure of thyroidectomized, hypophysectomized, and methylthiouracil-treated rats to respond to high environmental temperature and the

hyperthermia associated with a rise in metabolic rate.

2436
Bannister, R. G.,
D. J. C. Cunningham, and C. G. Douglas
THE CARBON DIOXIDE STIMULUS TO BREATHING IN SEVERE EXERCISE. — Jour. Physiol. (London), 125 (1): 90-117. July 28, 1954.
DLC (QP1.J75, v. 125)

The alveolar pCO_2, the pulmonary ventilation, the respiratory rate, and the blood lactate of two athletes and two non-athletic subjects were measured before, during, and after severe exercise on a motor-driven treadmill. In some instances rectal temperature was recorded. The ventilatory response and alveolar pCO_2 of two of the subjects were determined at rest when varying concentrations of CO_2 were added to the inspired air. In all instances during exercise the alveolar pCO_2 rose to levels above those found during the preceding rest. The rise was less marked during fairly severe than during lighter exercise. In maximal exercise, the alveolar pCO_2 rose to levels well above those found during lighter work. When oxygen was added to the inspired air during submaximal and maximal exercise, the alveolar pCO_2 fell to levels well below those recorded during the preliminary rest. In preliminary experiments on two subjects, 5.5% CO_2 was inhaled during recovery at the time which corresponded to the maximum depression of the alveolar pCO_2 in the earlier experiments. The resulting ventilations were much greater than those recorded during CO_2 inhalation at rest when this was not preceded by exercise. It is concluded that the accumulation of lactate and the raised body temperature together depressed the threshold of the respiratory center to CO_2 and that these three factors combined would account for the greater part of the hyperpnea of severe exercise when the possibility of arterial anoxemia was avoided by adding oxygen to the inspired air. When atmospheric air was breathed, an additional stimulus connected with want of oxygen appeared to be involved. The physiological dead space of the respiratory tract was calculated for the hyperpnea of exercise and of CO_2 breathing. In both conditions it increased considerably with the tidal volume. In an appendix, consideration is given to recent work on the alveolar-arterial blood gas relationships, together with some of the earlier concepts. (From the authors, summary)

2437
Bannister, R. G.,
and D. J. C. Cunningham
THE EFFECTS ON THE RESPIRATION AND PERFORMANCE DURING EXERCISE OF ADDING OXYGEN TO THE INSPIRED AIR. — Jour. Physiol. (London), 125 (1): 118-137. July 28, 1954. DLC (QP1.J75, v. 125)

Essentially the same as item no. 1034.

2438
Barch, A. M.
WARM-UP IN MASSED AND DISTRIBUTED PURSUIT ROTOR PERFORMANCE. — Jour. Exper. Psychol., 47 (5): 357-361. May 1954.
DLC (BF1.J6, v. 47)

Warm-up decrement was studied in the performance of a massed and a well-distributed practice group in an epicyclic pursuit rotor task. Warm-up was measured by the extent of the sharp initial rise in the postrest performance (initial increase method) or by the difference between the performance level on the last prerest trial and on the first postrest trial (decrement method). The initial increase method indicated that warm-up under distributed practice conditions increased to a maximum and then decreased as a function of the number of practice sessions. The decrement method indicated only a reliable increase in the amount of warm-up as the number of practice sessions

increased. No reliable trend for warm-up was obtained for the massed practice group. (Author's summary)

2439
Bargeton, D.,
M. Eon, C. Krumm-Heller, C. Libermann, and J. Masson
[EFFECT OF ADAPTATION ON THERMOREGULATION TO COLD IN THE RAT] Influence de l'adaptation sur les réactions thermorégulatrices au froid chez le rat. — Journal de physiologie (Paris), 46 (4): 845-860. 1954. In French. DNLM

Rats exposed to low temperature during the first day of their life showed thermoregulatory functions different from those of nonadapted controls. (1) When subjected to a temperature of 10° C., the colon temperature increased slightly in the adapted rats and decreased in the controls. (2) They produced more heat at 29.5° C. and less at 10° C. than did the controls. (3) At the same environmental temperature, the adapted animals regulated their heat loss better than the unadapted controls. The authors conclude that cold adaptation is characterized by an alteration of the general heat exchange (elevation of basal metabolism, improvement of the cutaneous protection), more ample physical thermoregulation, and reduced chemical thermoregulation.

2440
Bargeton, D.,
M. Eon, C. Krumm-Heller, C. Libermann, and J. Masson
[THERMOREGULATION IN THE RAT ADAPTED TO A LOW AND VARIABLE TEMPERATURE] La thermorégulation chez le Rat adapté à une température basse et variable. — Journal de physiologie (Paris), 46 (1): 234-236. 1954. In French. DNLM

Young rats bred at 6.4°C.-8.5°C. (lot A) and 29.5°C. (lot N) were subjected to temperatures of 29.5° for 24 hours and 10°C. for 30 minutes. At 29°C., lot A, in comparison with lot N, had a lower central temperature, 10°C. an elevated central temperature, a higher heat production, and a higher heat transfer coefficient, whereas at lower heat production, and a smaller heat transfer coefficient were noted. In addition, lot A, compared with lot N showed (1) a more efficient and economic thermoregulation to cold, (2) a small increase in chemical thermoregulation, and (3) a more important increase in physical thermoregulation.

2441
Baron, J.
[ON A NEW THERAPY OF SEASICKNESS] Sur une nouvelle therapeutique du mal de mer. — Revue d'oto-neuro-ophtalmologie (Paris), 26 (3): 186. 1954. In French. DNLM

The symptoms of seasickness are briefly noted, and a proposal is presented for its therapy using a retrobulbar injection of 2 cc. of procaine.

2442
Barr, N. L.
THE RADIO TRANSMISSION OF PHYSIOLOGICAL INFORMATION. — Military Surgeon, 114 (2): 79-83. Feb. 1954. DLC (RD1.A7, v. 114)

A system for transmitting various items of physiological data has been developed and tested successfully. The system offers a means of ascertaining the physiological conditions of pilots engaged in potentially hazardous flight in sufficient time for corrective measures to be employed. In addition, the system offers a means for the routine investigation of normal physiological functioning under all conditions of modern flight and a means for testing the adequacy of supportive equipment. (Author's summary)

2443
Barron, C. I. 1953
THE DANGER MAN FACES IN FLIGHTS ABOVE 50,000 FEET. — Aero Digest, 67 (6): 68. Dec. 1953. DLC (TL501.A292, v. 67)

Above 50,000 ft. the hazards of oxygen starvation and exposure to climatic extremes can be prevented only by cabin pressurization. At that altitude ultraviolet rays are greatly increased in intensity. Cosmic radiation between 70,000 to 90,000 feet is mainly primary radiation which is not considered to be physically harmful, but is capable of causing mutations. Above 90,000 ft. heavy nuclear rays have been detected, the effects of which are cumulative, similar to X-rays, and cause tissue damage. Cosmic radiation decreases in intensity above 100,000 ft.; however, the percentage of damaging rays increases. At high speeds, visual phenomena peculiar to high altitude interfere with the pilot's vision. Maintenance of a safe pressurized atmosphere for a 40-day interplanetary flight is considered possible.

2444
Barry, J. R.,
S. B. Sells, and B.[B.] Cobb
PERSONALITY CHARACTERISTICS OF THE POTENTIALLY SUCCESSFUL PILOT TRAINEE AS DETERMINED FROM A DEVELOPMENTAL HISTORY [Abstract] — Amer. Psychologist, 9 (6): 327. Aug. 1954.
DLC (BF1.A55, v. 9)

It was the purpose of this study to determine differences in experience and attitude which enable the prediction of the future psychological adjustment of pilot trainees. An experimental sample of 320 aviation cadets was used; the validation sample consisted of 110 cadets. A biographical inventory was completed by all cadets prior to training. At the end of training or at the time of failure, each cadet received detailed psychological assessment. Ratings of adjustment based on this assessment constituted the criterion. Half of each sample had failed and also received assessment ratings indicating inadequate adjustment to training; half had passed and were considered to have adjusted well to training. On the basis of an item analysis of experimental-sample data, 7 keys were developed. Six of the keys were cross-validated. As predicted, it was shown that the better adjusted cadets participated in active, athletic and "thrill-seeking" activities to a greater extent, they preferred gregarious, competitive work and play, and they had previous experience with precision tools. Those interests and background characteristics were not indicated by the inadequate cadets. Developmental history appears to be a fruitful source of evidence concerning potential adjustment of pilot trainees. (Abstract, modified)

2445
Barry, J. R.,
S. B. Sells, and D. K. Trites
PSYCHIATRIC SCREENING OF FLYING PERSONNEL, RESEARCH ON THE CORNELL WORD FORM. — School of Aviation Medicine, Randolph Field, Tex. May 1954. 35 p. (Project no. 21-0202-0007, Report no. 7). AD 54 625
PB 115493

The Cornell Word Form, an 80-item group word-association test, was administered to 1,036 entering student pilots as part of an experimental battery of psychiatric screening tests. The test authors' key was revised on the basis of empirical findings, and the resulting empirical key was cross-validated with significant results in three selected, but overlapping, samples. The criteria for these studies were various measures of adjustment in training. The findings justify the further consideration of this test in an operational psychiatric selection battery. (School of Aviation Medicine abstract)

2446
Bartlett, N. R.,
and S. Macleod
EFFECT OF FLASH AND FIELD LUMINANCE UPON HUMAN REACTION TIME. — Jour. Optical Soc. Amer., 44 (4): 306-311. April 1954.
DLC (QC350.06, v. 44)

Reaction time was measured from the onset of a single flash to the manual release of a microswitch. Responses were made by two trained subjects over wide ranges of stimulus intensity and under varying conditions of signal flash and background field luminance. Two types of experimental conditions prevailed: (1) variable flash luminance at each of three field levels, and (2) variable field luminance at three constant flash intensities. Thirty-six reactions were collected for every flash-field combination at each of two fixation positions (foveal and peripheral). The results are described by the following equation:

$$T = \frac{1}{B \log I/I_O} + K,$$

whereby B = slope constant, I = flash luminance, I_O = a limiting flash intensity at which the reaction time approaches infinity, K = limiting latency. (Authors' summary, modified)

2447

Bartlett, R. G. 1952

FACTORS AFFECTING THE RESPIRATORY QUOTIENT. — (Thesis, Univ. of Maryland, College Park, 1952). 96 + [9] p. [Typewritten copy.]

DLC (QP121.B27)

A comparison of the effects of inhalation of CO_2-enriched air by mice, rats, dogs, and humans showed a fundamental difference between the response of large mammals and small mammals. The oxygen consumption in the former was increased slightly, while in mice and rats it decreased significantly. CO_2 inhalation acted as a physiologic stress in mice and rats resulting in loss of temperature control and hypothermia. A significant drop was observed in the measured respiratory quotients in rats, mice, dogs and humans, indicating storage of CO_2 to be a universal response. The tissue and blood buffer capacity could account only for a part of the stored CO_2. Several avenues of storage open to the body are suggested, among which there is some experimental evidence for a shift toward fat metabolism resulting in a lessened CO_2 production. Most of the O_2 debt was repaid during the first few minutes of breathing atmospheric air. Similarly the most rapid release of the CO_2 occurred during the first few minutes. Under the conditions of this experiment the recorded respiratory quotients varied extensively, and had to be interpreted with caution. (78 references.)

2448

Bartlett, R. G., 1953

R. H. Helmendach, and V. C. Bohr

EFFECT OF EMOTIONAL STRESS, ANESTHESIA, AND DEATH ON BODY TEMPERATURE OF MICE EXPOSED TO COLD. — Proc. Soc. Exper. Biol. and Med., 83 (1): 4-5. May 1953.

DLC (QP1.S8, v. 83)

Both restrained and unrestrained mice were exposed to cold. The unrestrained animals experienced a small drop in body temperature as compared to the restrained animals whose body temperature dropped to the death point (approx. 10°C.) in about one hour. Anesthetized and dead mice demonstrated greater temperature drops than were found in conscious restrained mice. Conditioning by maintaining the animals one hour per day in restraining cages resulted in a lesser temperature drop on exposure to cold as well as greatly decreased mortality. It was concluded that emotional hypothermia, not resulting from restricted breathing, can be produced in mice by the stress of confinement. (Authors' summary)

2449

Bartlett, R. G.,

V. C. Bohr, and R. H. Helmendach

ABILITY OF RAT TO ADAPT TO STRESS OF LIGHT RESTRAINT. — Proc. Soc. Exper. Biol. and Med., 86 (2): 395-396. June 1954.

DLC (QP1.S8, v. 86)

The ability of the albino rat to adapt to stress of light restraint was investigated. The rats were able to

adapt to the stress of restraint in a cylinder of wire mesh for one week so that they did not become hypothermic when exposed to the stress in the cold. The possible roles of emotional adaptation and adrenal cortical activity in producing the increased resistance to these stresses are discussed. (Authors' summary)

2450
Bartlett, R. G.,
R. H. Helmendach, and W. I. Inman
EFFECT OF RESTRAINT ON TEMPERATURE REGULATION IN THE CAT. — Proc. Soc. Exper. Biol. and Med., 85 (1): 81-83. Jan. 1954.
DLC (QP1.S8, v. 85)

Healthy adult male and female cats were restrained in essentially normal positions by binding of legs or head to stationary supports. The effect of exposure on the body temperature of these animals in a cold room (-15°C. ± 2°C.) was compared with that of dead animals and with controls which were housed individually in large cages. Temperatures were taken with indwelling rectal thermometers in the dead and restrained animals and at the beginning and end of the tests in the case of the control cats. Body temperatures of the restrained animals over a 2-hour exposure fell markedly (5.6°C.) as compared to the control group (1.2°C.). Since the animals were not caged, the hypothermia which resulted must be attributed to factors other than restricted breathing, perhaps partially to emotional stress. It is presumed that a similar mechanism may operate also in the human. The lowering of body temperature in the cold could impose a serious handicap upon personnel exposed to a stressful situation in the cold. (Authors' summary, modified)

2451
Bartlett, R. G.,
V. C. Bohr, R. H. Helmendach, G. L. Foster, and M. A. Miller
EVIDENCE OF AN EMOTIONAL FACTOR IN HYPOTHERMIA PRODUCED BY RESTRAINT.—Amer. Jour. Physiol., 179 (2): 343-346. Nov. 1954.
DLC (QP1.A5, v. 179)

Loss of temperature control as a result of restraint was determined in young male adult Sprague-Dawley rats. Twenty-six control rats, 26 restrained rats, and 40 dead rats were exposed for 2 hr. in a cold room temperature of 2° C. ± 2°. The controls were maintained individually in large cages, the restrained rats were placed in loosely-fitted, wire mesh cylinders, and half the dead animals were placed in wire cylinders, and half on wooden tables. By groups, the body temperature drop was successively greater in the following order: control, restrained, and dead. In all groups the body temperature fall was more rapid during the first portion of the exposure period. The animals were divided into two groups — the more emotional and the less emotional — on the basis of the open field test of C. S. Hall (Jour. Compar. Psychol., 18 (3): 385-403, 1934), wherein the number of days the animals defecated was used as an index of emotionality. These two groups were then tested for relative thermostability by the use of restraint in the cold using the degrees of hypothermia as an index. The more emotional animals experienced a greater drop in body temperature. It was concluded that hypothermia in rats may be produced by light restraint and that the degree of hypothermia is correlated with the emotionality of the rats.

2452
Bartlett, R. G.,
and U. D. Register
FURTHER STUDIES ON EFFECT OF COLD AND RESTRAINT ON TISSUE NON-PROTEIN SULFHYDRYL COMPOUNDS. — Proc. Soc. Exper. Biol. and Med., 86 (2): 397-399. June 1954.
DLC (QP1.S8, v. 86)

Both hypothermia and restraint were independently capable of decreasing

the concentration of total non-protein liver sulfhydryl (NPSH), which plays an important part in carbohydrate and fat metabolism. When these stresses were applied simultaneously, the effects of the two stresses were approximately additive. No significant change of NPSH was observed in the muscle and kidney. The possibility that the more immediate cause of the drop in concentration of liver NPSH was activation of the sympathoadrenal mechanism is discussed. (Authors' summary, modified)

2453

Basu, A. K.

DEVELOPMENT OF "ANTI-G" VALVE. — Aero Med. Soc. Jour. (New Delhi), 1 (1): 9-18. April 1954. DNLM

A new anti-g valve for the inflation and air supply regulation of g-suits was designed by the Aviation Medicine Research Centre in India. The anti-g valve consists basically of two units — an air admission valve and an air pressure regulating valve. The former, a stainless steel rotor mounted on ball bearings, oscillates at an angle of 90° in the housing. The rotor has a through hole and two slots, which have a 90° phase difference. When all three are in line the through hole permits air to pass from the inlet to the outlet. The rotor is activated by a solenoid through a gear mechanism. The solenoid is energized when the centrifugal force automatically closes a micro-switch. A drawback noted was that, as the clearance between the rotor and the housing is of the order of 0.002 in., any trace of oil in the air supply made the rotor stick. The pressure regulating valve is based on the safety valve principle. When the aircraft goes into a maneuver, the centrifugal force acts on the moving brass weight of the regulating valve, and the valve port is closed. The back pressure of the air in the valve body rises to the particular value automatically determined by the regulating valve. The pressure at which the valve should open is automatically governed by the g acting on the moving pressure. The valve which has been flight-tested in a jet aircraft has the following advantages: (1) simple design, (2) practically no maintenance problems, and (3) great flexibility of adjustment, both with regard to the g at which the suit should start functioning and the rate of pressure increase with increasing g.

2454

Batini, C.,
M. Parma, G. F. Ricci, and A. Zanchetti

[ELECTROENCEPHALOGRAPHIC ASPECTS OF THE HYPEROXIC CONVULSIVE SYNDROME] Aspetti elettroencefalografici della sindrome convulsiva iperossica. — Archivio di fisiologia (Firenze), 53 (4): 346-353. Feb. 20, 1954. In Italian, with English summary (p. 352-353). DNLM

Oxygen administered at high pressure (7 atmospheres) to unanesthetized cats induced seizures of the grand mal type. These convulsions subsided soon after decompression. Oxygen administered to anesthetized cats induced epileptic convulsions within 20 minutes. This convulsive activity consisted of intermittent clonic movements which persisted after decompression. In both anesthetized and unanesthetized animals, epileptic waves were recorded electroencephalographically from cortical areas, the caudate nucleus and intralaminar thalamic nuclei. In these subcortical areas, convulsive activity appears on occasion with a longer latency than in the cortex. (Authors' summary, modified).

2455

Batini, C.,
M. Parma, G. F. Ricci, and A. Zanchetti

[PYRAMIDAL AND EXTRAPYRAMIDAL MECHANISMS OF HYPEROXIC CONVULSIONS.] Meccanismi piramidali ed extrapiramidali delle convulsioni iperossiche. — Archivio di fisiologia (Firenze), 53 (4): 362-369. Feb. 20, 1954, In Italian, with English summary (p. 368-369) DNLM

Hyperoxic convulsions in cats are suppressed by the acute or chronic removal of the contralateral motor cortex or by contralateral medullary pyramidotomy. Seizures are totally absent in anesthetized animals, whereas in unanesthetized animals slight clonic movements are observed. In cats whose pyramidal pathways are intact normal convulsive manifestations are observed. It is concluded that hyperoxia convulsions are essentially pyramidal in origin and that extrapyramidal mechanisms contribute a very small part to these seizures. (Authors' summary)

2456
Battig, W. F.

THE EFFECT OF KINESTHETIC, VERBAL, AND VISUAL CUES ON THE ACQUISITION OF A LEVER-POSITIONING SKILL. — Jour. Exper. Psychol., 47 (5): 371-380. May 1954. DLC (BF1.J6, v. 47)

An attempt was made to determine the roles of kinesthetic, verbal, and visual cues in the acquisition of a lever-positioning skill by comparing performance following training procedures in which these cues were differentially emphasized. All subjects performed the same task on the first and last of ten practice sessions, but six groups were differentiated on the basis of their task during the middle eight sessions. A comparison of post-test scores showed that Group A (standard practice) was superior to all other groups. Of the experimental groups, Group B (verbal stimulus) was best, followed in order by Group D (kinesthetic response), Group C (verbal response), and Group E (verbal stimulus-kinesthetic response). Groups A, B, and D showed significant improvement over a group with no training practice (Group A'), but Groups C and E did not. It is concluded that training on any modification of the standard task produces performance inferior to that following standard practice. Long periods of practice on tasks closely related to the standard task may even produce negative transfer. The presence of interference between the standard and training tasks makes it difficult to compare the roles of the various types of cues, but the results point to the importance of visual cues for this particular skill. (Author's summary)

2457
Beattie, J., 1953
and R. D. Chambers

OXYGEN CONSUMPTION IN HEAT-ADAPTED ANIMALS. — Quart. Jour. Exper. Physiol. (London), 38 (2): 55-60. May 1953. DNLM

Heat adaptation of albino rats to an environmental temperature of 29.5°C. requires a period of not less than 28 days. Complete adaptation is indicated when animals within a small weight range (180-260 g.) show a mean heat production which has a standard deviation of less than 3% of the mean value. A slight seasonal change occurs relatively suddenly at the end of May, when the heat production level falls by about 5%. The change to the winter level has not been determined with certainty but may occur in mid-August. The "winter" level of heat production lies between 690 and 712 cal./sq. m./24 hr., and the "summer" level between 657 and 679 cal./sq. m./24 hr. (Authors' summary).

2458
Beck, L. V.,
W. H. Linkenheimer, and A. Marraccini

EFFECTS OF TUMBLING TRAUMA, SCALDING AND HEMORRHAGE ON RAT TISSUE NON-PROTEIN SULFHYDRYL. — Proc. Soc. Exper. Biol. and Med., 86 (4): 823-827. Aug.-Sept. 1954. DLC (QP1.S8, v. 86)

Significant decreases in concentration of non-protein sulfhydryl (-SH) were noted in rat liver following tumbling trauma, and in rat liver and kidney following severe scalding. In analyses confined to the liver, a significant decrease in liver non-protein -SH

was noted following severe hemmorrhage. No appreciable change was noted in either liver protein -SH or extractable liver protein. Blood non-protein -SH concentrations were practically identical for control and tumbled rats. Scalded rats exhibited a moderate increase in concentration of blood non-protein -SH, paralleling the hemoconcentration. (Authors' summary)

2459
Becker, H., 1952
and G. Quadbeck
[INVESTIGATIONS OF THE DISTURBANCES IN FUNCTION OF THE BLOOD-BRAIN BARRIER IN ANOXIA AND CARBON MONOXIDE POISONING BY MEANS OF THE NEW BARRIER INDICATOR, ASTRAVIOLETT FF] Untersuchungen über Funktionsstörungen der Blut-Hirnschranke bei Sauerstoffmangel und Kohlenoxydvergiftung mit dem neuen Schrankenindikator Astraviolett FF. — Zeitschrift für Naturforschung (Tübingen), 7b (9/10): 498-500. Sept./Oct. 1952. In German.
DLC (Q3.Z39, v. 7B)

Rabbits and dogs were subjected for 3-7 hrs. to an altitude of 11,000 m. in a pressure chamber. At this altitude the ensuing anoxia was manifested by a moderate hypotonia, occasional ataxia, and an increase in the respiratory rate. The descent was carried out within a few minutes before the appearance of any critical anoxic symptoms. It was possible to show by intracardial and intravenous injections of Astraviolett FF that even a moderate degree of hypoxia leads to a disturbance of the permeability of the blood-brain barrier due to changes in the electropotential distribution on the endothelium as a result of a depression of the pH. At this stage no tissue damage can be observed. The pathological sequence of anoxic damage is as follows: (1) disturbance in the permeability of the barriers, (2) edema, and (3) anoxic and edematous tissue damage. It was also possible by means of Astraviolett FF to demonstrate an increased permeability of the blood-brain barrier in early stages of subacute carbon monoxide poisoning, which is partly due to the anoxia and partly to the direct toxic effect of CO. It is concluded that Astraviolett FF is a more sensitive permeability indicator than the customary trypan blue.

2460
Beckh, H. J. A. von
EXPERIMENTS WITH ANIMALS AND HUMAN SUBJECTS UNDER SUB-AND ZERO-GRAVITY CONDITIONS DURING THE DIVE AND PARABOLIC FLIGHT. — Jour. Aviation Med., 25 (3): 235-241. June 1954.
DLC (TL555.A1A4, v. 25)

A water turtle whose labyrinthine functions had been destroyed behaved with complete normality under zero- and sub-gravity conditions (in vertical dives in an airplane) due to the fact that it was visually adapted. Three other turtles, having normal labyrinthine functions, became completely disoriented during zero- and sub-gravity conditions inasmuch as their adaptation was not primarily visual. — Human subjects were tested under conditions of zero- and sub-gravity (during horizontal flight, radial acceleration, dives), with their eyes open and again with their eyes closed. In their attempt to draw a left to right descending pattern on a paper pad, the subjects achieved the following results: during zero-gravity with their eyes open, they marked a series of X's in the diagonal pattern with little difficulty; with their eyes closed, they were unable to follow the diagonal pattern, making a 90° deviation toward the right-hand top corner of the pad. With practice, the execution of the test improved. Orientation of all the subjects was extremely affected by the weightless state.

2461
Beckman, E. L.,
T. D. Duane, J. E. Ziegler, and
H. N. Hunter

SOME OBSERVATIONS ON HUMAN TOLERANCE TO ACCELERATIVE STRESS. IV. HUMAN TOLERANCE TO HIGH POSITIVE G APPLIED AT A RATE OF 5 TO 10 G PER SECOND. — Jour. Aviation Med., 25 (1): 50-65. Feb. 1954. DLC (TL555.A1A4, v. 25)

Eleven subjects were exposed to high positive accelerations (3-5 g) on the centrifuge, and the durations of the loads required to produce unconsciousness were measured. The time required to produce unconsciousness was longer at low levels and shorter at high levels of acceleration. The mean value for the time above 3 g during the runs which produced unconsciousness was 4.2 seconds. After unconsciousness had been produced, the subjects returned to consciousness within 5-10 seconds. Unconsciousness was not preceded by loss of peripheral vision and blackout usually experienced when the exposure is to loads of less than 8 positive g. Unconsciousness did not occur until the arterial pressure at the base of the brain had dropped to zero (at a mean level of 5 g). From the data obtained it was assumed that stasis of the cerebral circulation was produced by accelerations of 3, 4, or 5 g. There was no significant difference between the duration of the acceleration required to produce unconsciousness at 8, 10, 12, or 15 g, if the time was measured as the duration of the load above 3, 4, or 5 g.

2462
Becquerel, P. 1952
[THE SUSPENSION OF LIFE NEAR THE ABSOLUTE ZERO] La suspension de la vie aux confins du zero absolu. — Scientia (Bologna), 87 (9): 242-246. 1952. In French. DLC (Q4.S4, v. 87)

The author describes experiments in which carefully dehydrated organisms were subjected to temperatures of less than 0.01°K. (-273°C.) and subsequently restored to life. Among these organisms were Tardigrades, Rotifera, seeds of flowering plants, spores of bacteria and fungi, algae, and fragments of various lichens and mosses. These organisms were placed into a tube of iron alum ($FeK(SO_4)_2$), which was suspended in liquid helium, and its temperature further reduced by adiabatic demagnetization. At 0.10°K the helium pressure is practically zero and the vacuum complete. After keeping these organisms for some time near absolute zero, near absolute vacuum, and almost completely dehydrated, they were rapidly thawed and rehydrated by placing them into hot water and then cultivated. The seeds and spores germinated, the animals and plants started growing again. For the first time it is hereby demonstrated that completely dehydrated organisms can stand the combined action of complete vacuum and temperatures of a few thousandths degrees Kelvin. The biological consequences are extraordinary: (1) Through the combined action of vacuum, dehydration, and low temperature it is possible to suppress the colloidal state of the protoplasm, necessary to all life processes, without affecting its capacity to resume active life upon thawing. (2) As long as these conditions prevail, life can be kept in suspension for an unlimited time. (3) Cytonucleoplasmic syneresis is the mechanism by which living organisms congeal at low temperatures. (4) This syneresis can be a reversible or irreversible process. (5) The irreversibility may be due either to minute residues of moisture or to a delay in thawing. (6) The above described experiments explain the existence of vegetation at the poles or at high altitudes. (7) Panspermia, which is naturally impossible due to the action of ultraviolet radiation, could materialize as a consequence of astronautic progress. (8) Congealed organisms have a latent or dormant vitality of indefinite duration which explains the possibility that life may exist on the planet Mars.

2463
Bedford, T. 1953
THERMAL FACTORS IN THE

ENVIRONMENT WHICH INFLUENCE FATIGUE. — In: Floyd, W. F. and A. T. Welford, ed. Symposium on Fatigue, p. 7-17. London: H. K. Lewis and Co., Ltd., 1953. DNLM

"Cultural factors" play a role in determining a person's subjective sensation of thermal comfort; e.g., in Britain lower room temperatures are demanded than in the United States. Studies of miners show a general decline in working efficiency coupled with increases in accident rates for older age groups in the hotter seams. Also, individuals exposed at intervals to extreme heat were found to be more susceptible to rheumatism and respiratory diseases. The limiting temperatures established for industrial workers differ according to the kind of work to be done. For active work requiring moderate effort, the wet bulb temperature should not exceed 72° F.

2464
Bedrossian, E. H.
SIGNIFICANCE OF RED-LENS DIPLOPIA; ITS RELATIONSHIP TO HETEROPHORIA. — Amer. Jour. Ophthalmol., 35 (9): 1356-1357. Sept. 1954. DNLM

Red-lens diplopia was found in approximately 50% of 119 normal-vision candidates. This diplopia was equal in amount to the heterophoria (as revealed by red Maddox rod tests) in 92% and less in 8%; 84% of the candidates were able to fuse a blue lens, and 90% were able to fuse a red and blue lens. All the cases of colored-glass diplopia were the same in degree in the cardinal positions of gaze, and are, therefore, considered to be a phoria and not a palsy of an extra-ocular muscle. It is concluded that red-lens diplopia should not disqualify candidates for flying unless it increases in amount in the field of action of an ocular muscle, thereby indicating a muscle paresis.

2465
Bell, A. L. L.,
and J. E. Wood
A NEW DEVICE FOR MEASURING THE EFFECTS OF CONTINUOUS POSITIVE PRESSURE BREATHING ON LUNG VOLUMES AND VENTILATION. — Jour. Aviation Med., 25 (1): 67-74, 88. Feb. 1954 DLC (TL555.A1A4, v. 25)

A device for measuring the pattern of breathing, lung volumes, ventilation, and oxygen consumption during high positive pressure breathing is described. The experimental design is indicated, and representative tracings demonstrating the effect on these respiratory variables of continuous positive breathing pressures up to 50 mm. Hg. (Authors' summary)

2466
Bellecci, P.
[VISUAL FATIGUE OF RADAR OPERATORS] La fatigue oculaire des opérateurs radar. — Bulletin international des Services de santé des armées de terre, de mer, et de l'air (Liège), 27 (6): 280-289. June 1954. In French. DLC (RC970.B77, v. 27)

The radar operator sits in a dark room in front of a fluorescent screen and concentrates his attention either on the entire screen, its peripheric parts, or on strips running horizontally or vertically across the screen diameter. This very exacting occupation may lead to visual disturbances such as visual fatigue, asthenopia, but also to headache, insomnia, and nausea. The occurrence of these troubles depends on the length of time on duty, the comfort of seating, and several other physiological factors. Heterophoria, hypermetropia, and anisometropia with convergent or divergent strabismus may produce differences in the relative size of the images in both eyes and spatial distortions of serious degrees. In addition, the muscular balance and the power of fusion in binocular vision may be severely affected giving rise to visual fatigue and concomitant disturbances. Also anisoconia, an anomaly of the functional organization of the retina, could produce asthenopia in radar operators. The best radar

operator should be a subject with slight myopia, while the worst would have hypermetropia or astigmatism. The visual acuity of radar operators should be 7/10 in 00 if they are isometropic, with corrections to 10/10 in 00. To reduce the incidence of visual fatigue it is suggested that the duration of duty should not exceed half an hour; that the position of the operator before the screen should be adjusted in a proper way; and that red glasses be used to adjust the eyes to darkness and protect them against exposure to sunlight. Finally, a research program is proposed comprising the study of (1) differences in visual acuity of radar operators with reduced and normal vision; (2) the effect of the rotational speed of the radar antenna; (3) the best level of contrast between screen and surroundings.

2467
Benda, L.,
A. Locker, and E. Rissel
[CELLULAR METABOLISM AND INFLAMMATION. IV. RECOVERY RESPIRATION OF THE LIVER AFTER HYPOXIA IN VIVO] Zellstoffwechslung und Entzündung. IV. Mitteilung. Die Erholungsatmung der Leber nach Hypoxie in vivo. —Zeitschrift für die gesamte experimentelle Medizin (Berlin), 123 (2): 141-151. 1954. In German
DNLM

In continuation of previous research on the effects of decompression tissue respiration in the liver, this study investigates the effects of recovery in air. After cessation of decompression, an increase in cellular respiration was observed, which seems to depend on the suspension media. In a glucose-free bicarbonate-Ringer solution, the initial inhibition of respiration started quickly and returned to the normal values in the course of recovery. In a glucose-free phosphate buffer solution, the oxygen utilization also increased, while no changes were observed in a phosphate-Ringer solution. As to the mechanism of the observed metabolic reactions, it is hypothesized that endogenous (present) carbohydrates and exogenous (available) carbohydrates compete with each other. The role of the reversible structural changes and of the inorganic phosphate is discussed. (Authors' summary, translated and modified)

2468
Benepe, O. J.,
R. Narsimhan, and D. G. Ellson
AN EXPERIMENTAL EVALUATION OF THE APPLICATION OF HARMONIC ANALYSIS TO THE TRACKING BEHAVIOR OF THE HUMAN OPERATOR. — Indiana Univ., Bloomington (Contract AF 18(600)-16); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Rept. no. 53-384, May 1954, v + 38 p. (RDO no. 694-39). AD-38 148
UNCLASSIFIED

Five experiments were carried out to determine the applicability of harmonic analysis to the tracking behavior of the human operator for the purpose of obtaining descriptions of the behavior useful to systems design engineers. The results indicate that the behavior is nonstationary and nonlinear in simple visual tracking situations. However, under the condition of an auditory input mathematically equivalent to and presented simultaneously with the visual input the behavior is stationary. The error behavior in this case resembles low power, random noise.

2469
Bergamini, V. 1953
[ELECTROENCEPHALOGRAPHIC CHANGES DURING ACUTE HYPOXIA CAUSED BY THE REBREATHING OF AN O_2-POOR MIXTURE BY NORMAL SUBJECTS BEFORE AND AFTER TREATMENT WITH ALPHA-TOCOPHEROL] Alterazioni elettroencefalografiche nel corso dell'ipossia acuta da rirespirazione di miscela povera di O_2 in soggetti normali prima e durante il trattamento con alfa-tocoferolo. — Atti

del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 3-15. In Italian, with English summary (p.13). DNLM (W3.CO943a)

Electroencephalographic changes are essentially characterized by a prolonged delta wave in acute hypoxia induced by the rebreathing of a 7.5% O_2 mixture in N_2. An increased resistance to hypoxia is demonstrated following alpha-tocopherol administration, and no significant EEG variations are noted. These findings correlated with circulatory and respiratory data, indicate a decreased O_2 consumption, which is caused by alpha-tocopherol.

2470
Berger, C.,
and A. Mahneke
FATIGUE IN TWO SIMPLE VISUAL TASKS. — Amer. Jour. Psychol. 67 (3): 509-512. Sept. 1954.
DLC (BF1.A5, v. 67)

The purpose of this study was to describe the development of fatigue, measured in terms of decrement in performance, during the exercise of two relatively circumscribed visual functions. In the first experiment, Landolt's ring was used as a stimulus object for 3 observers. Curves of the results obtained showed a decrease in visual acuity during the course of work with no systematic change in variability of setting. In the second experiment, the decrease in critical fusion frequency was used as an index of visual fatigue for 2 emmetropic subjects. Both subjects showed striking decline in CFF without systematic change in variability. The amount of recovery during rest seemed to be less than in the work with Landolt's ring. The authors conclude that the course of visual fatigue can be determined accurately in terms of quantitative measures of performance if the test stimulus itself is used as the tiring agent, and if some of the compensatory factors (rest periods) are reduced.

2471
Bergstrand, A.,
and G. Sterky
RENAL FUNCTION IN HYPOTHERMIA. — Acta physiologica scandinavica (Stockholm), 31 (1): 13-21. 1954. In English. DNLM

Glomerular filtration rate and renal plasma flow were measured by creatinine and Umbradil clearance in dogs at normal temperature, during a decrease in body temperature to 18° -20° C., and during rewarming. The tubular excretion of Umbradil was also calculated. Changes in renal functions parallel to the decrease or increase in temperature were observed. The oxygen consumption in the kidneys was considerably decreased at low temperatures, but the differences in oxygen content and saturation between the arterial and renal venous blood showed no regular alterations. (Authors' summary)

2472
Berkeley, M. H.
A METHOD FOR DEVELOPING EQUIVALENT FORMS OF TESTS OF COMPLEX FUNCTIONS. — Educational and Psychol. Measurement, 14 (3): 518-528. Autumn 1954.
DLC (BF1.E3, v. 14)

A review has indicated a need for a relatively simple method for developing comparable forms of a test composed of heterogeneous areas relevant to personality and attitude. The purpose of this study was to present such a method and examine its utility in building equivalent forms. The method proposed is a modification of the DuBois, Loevinger, and Gleser method for maximizing test saturation. By this procedure two 14-item tests were developed from an Air Force attitude survey given to a combined sample of airmen, officer candidates, air cadets, and officers. The two forms were tested for equivalence on two independent samples, including the total population in one sample and air cadets in the other sample. The score distribution of the two forms

were shown to yield equal means and equal variances, and the covariances of the two forms with two external measures were equal. It is concluded that the modified method of maximizing saturation appears to result in equivalent forms of tests of complex functions. (Author's summary, modified)

2473

Berlin, N. I ,
C. Reynafarje, and J. H. Lawrence
RED CELL LIFE SPAN IN THE POLYCYTHEMIA OF HIGH ALTITUDE. — Jour. Applied Physiol., 7 (3): 271-272. Nov. 1954. DLC (QP1.J72, v. 7)

The red cell life span was found to be normal in Peruvian natives born and residing at an altitude exceeding 12,000 feet and having high-altitude polycythemia. Therefore it may be assumed that altitude polycythemia is the result of an increase in the rate of red cell production rather than by a lengthening of the life span of the red cell.

2474

Berne, R. M.
THE EFFECT OF IMMERSION HYPOTHERMIA ON CORONARY BLOOD FLOW. — Circulation Research, 2 (3): 236-242. May 1954.
DLC (RC681.A1A57137, v. 2)

In severe hypothermia, resistance in the coronary vascular bed is reduced and flow continues despite very low aortic pressure. Moderate artificial acceleration of the hypothermic heart at constant coronary perfusion pressures produces a decrease in coronary blood flow. This decrease in flow is roughly proportional to the increase in heart rate and is due to the longer periods of extravascular compression in each cardiac cycle. Epinephrine produces transient improvement in blood pressure and coronary blood flow but is followed in a matter of minutes by ventricular fibrillation. (Author's summary)

2475

Berne, R. M.
MYOCARDIAL FUNCTION IN SEVERE HYPOTHERMIA. — Circulation Research, 2 (1): 90-95. Jan. 1954.
DLC (RC681.A1A57137, v. 2)

Progressive generalized hypothermia was produced experimentally in the anesthetized open-chested dog by immersion in ice water. Pressure pulses recorded from the left ventricle, the left atrium, and the aorta revealed that even in severe hypothermia the heart did not exhibit typical signs of myocardial failure. The striking changes induced by hypothermia were the marked prolongation of systole and of isometric relaxation. At low temperatures, increases in heart rate from approximately 10 to 60 beats per minute produced by atrial stimulation seriously interfered with cardiac filling. This was in large part due to the fact that isometric relaxation consumed a major portion of diastole, which considerably reduced ventricular filling-time and eliminated the atrial contribution to cardiac filling. Our observations support the contention that hypothermia, as employed in cardiac surgery, does not seriously interfere with myocardial competence, provided its natural slow rhythm is maintained. (Author's summary)

2476

Berry, L. J , 1953
and R. B. Mitchell
INFLUENCE OF SIMULATED ALTITUDE ON RESISTANCE-SUSCEPTIBILITY TO S. TYPHIMURIUM INFECTION IN MICE. — Texas Reports Biol. and Med., 11 (3): 379-401. Fall 1953. DLC (R11.T4, v. 11)

Essentially the same as the paper, Berry, L. J., 1952a (vol. 1, item no. 149).

2477

Bertram, G. C. L.
THE PROVISIONING OF EXPEDITIONS IN THE FIELD: THE EVOLUTION OF POLAR RATIONS. — Proc. Nutrition Soc. (London), 13 (1): 69-73. 1954.
DLC (TX501.N9, v. 13)

Lightness of weight and high caloric

content have been the primary considerations in the development of polar rations. Earlier prevalence of hunger in prolonged stays in polar regions has largely disappeared because of the transition to mechanical transport, facilitating an adequate supply of rations.

2478
Bexton, W. H.,
W. Heron, and T. H. Scott
EFFECTS OF DECREASED VARIATION IN THE SENSORY ENVIRONMENT. — Canad. Jour. Psychol. (Toronto), 8 (2): 70-76. June 1954.
DLC (BF1.C3, v. 8)

This study was undertaken to investigate lapses of attention that may occur when a man must give close and prolonged attention to some aspects of an environment in which nothing is happening, or where the changes are very regular. Recent neurophysiological studies have indicated the necessity of changing sensory input for maintenance of normal, adaptive behavior. Twenty-two male college students, who were paid for the duration of the experiment, were employed as test subjects. Since a complete perceptual isolation was impossible, it was attempted to keep the subject in a restricted environment limited to non-specific or monotonous visual, auditory, and tactual stimuli. Among general effects observed during the subjects' stay in the experimental cubicle were sleep in the early part of the experiment, later restlessness accompanied by constant random movements, and unusual emotional lability. Hallucinations in visual, auditory, kinesthetic and somesthetic spheres in varying degrees of complexity were reported by many subjects. Also, feelings of bodily dissociation were reported by several subjects. Cognition tests given before, during, and after isolation period showed deteriorating performance reflecting cognitive and motivational changes. After-effects noted on leaving the isolation cubicle were daze, difficulty in focussing, and subjective feelings of confusion, headaches, nausea and fatigue. The authors conclude that both the changes in intelligence-test performance and the hallucinatory activity, induced merely by limiting the variability of sensory input, provide direct evidence of a kind of dependence on the environment that has not been previously recognized. Further experimental study is needed to elucidate the details of this relationship. (Quoted in part)

2479
Beyne, J.
[PERCEPTION APTITUDE FOR COLOR SIGNALS: EVALUATION METHODS] L'aptitude à percevoir les signaux colorés: ses modes d'évaluation. — Médecine aéronautique (Paris), 9 (1): 5-17. 1954. In French.
DLC (TL555.M394, v. 9)

The visibility of different colors varies greatly: it is highest at about λ=555 mμ in the yellow-green region, only 1/10 as strong in the red, and 1/20 in the violet region. Every color can be reproduced by adding to white an additional color of the wave length λ. Color perception is influenced by light intensities, purity of colors, contrast, and the time factor. Colored light signals used in aviation are either ground beacons (yellow, red, and green) or aviation signals (red and green). The aptitude test has to distinguish between two types of signals, those which have a noticeable diameter and those which are punctiform. Both tests supplement each other and provide information about perception of color quality, light intensity, apparent diameter of light signal, and time of presentation. Seventy five per cent of the subjects tested showed anomalies of color vision inasmuch as they had a correct notion of color, but required either large lighted surfaces or high light intensities or a too long presentation time. Only a methodic examination with proper instruments will reveal these deficiencies.

2480
Bietti, G. B., 1953
A. Grignolo, and B. B. Carenini

[CRITICAL FLICKER FUSION FREQUENCY OF LIGHT STIMULI UNDER CONDITIONS OF MODIFIED OXYGEN SUPPLY TO THE VISUAL APPARATUS] Comportamento della frequenza critica di fusione degli stimoli luminosi in condizioni di modificato apporto di ossigeno all'apparato visivo. – Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Part III: Comunicazioni, p. 16-45. In Italian, with English summary (p. 43).

DNLM (W3.C0943a)

Inhalation of an O_2-poor mixture, corresponding to a simulated altitude of 3,000 meters (10,000 feet), induces a decrease of the central but not the peripheral critical fusion frequency, whereas an O_2-poor mixture corresponding to altitudes of 5,500 and 8,000 meters (18,000 and 26,500 feet) induces a decrease in both central and peripheral fusion frequencies. Pure O_2 administration at atmospheric pressure augments the central but not the peripheral critical fusion frequency, and hyperpnea induces no significant change in either central or peripheral fusion frequencies. It is concluded that critical fusion frequency appears to be influenced by hypoxia.

2481

Biget, P. L.

[ENDOGENOUS CARBON MONOXIDE IN THE BLOOD AND ANOXIA] Oxycarbonémie endogène et anoxie. – Journal de physiologie (Paris), 46 (1): 248-249. 1954. In French. DNLM

Seven males (smokers and nonsmokers) were exposed in a decompression chamber to a simulated altitude of 4,000 m. for one hour. Erythrocyte count, venous CO levels, and the percentage of carboxyhemoglobin saturation were determined before and after the experiment. In the majority of subjects the number of erythrocytes increased in proportions varying from 4-20%. Five subjects presented a low blood CO level; CO levels of the other two remained unchanged. No evaluation of the effect of tobacco was made since one subject was a heavy smoker and another a non-smoker. The author concludes that experimental anoxia is not a contributing factor to endogenous carbon monoxide in human blood.

2482

Bilger, R. C.

A COMPARISON OF MONAURAL AND BINAURAL LISTENING IN THREE LEVELS OF AMBIENT NOISE. – (Thesis, Purdue Univ., Lafayette, Indiana). 91 p. Ann Arbor: University Microfilms, 1954.

DLC (Microfilm AC-1, no. 9890)

Speech reception thresholds and the corresponding standard deviations were determined for four listening conditions (binaural, in phase; binaural, out of phase; monaural, wearing 2 phones; and monaural, wearing one phone) on three levels (55, 80, and 105 db.) of an ambient noise of a spectrum similar to that of a conventional aircraft. Thirteen adults with normal hearing were tested, each under all twelve conditions. The data were computed by analysis of variance technique. The average binaural speech reception threshold was found to be 1.2 db. lower than the average monaural speech reception threshold. In 105 db. ambient noise level the one phone monaural threshold did not differ from the average binaural threshold. The interaural inhibition was attributed to spatial separation of the signal from the noise due to intensity differences. The binaural, out of phase, threshold was found to be more variable than the binaural, in phase, threshold. 44 references. (Author's abstract, modified)

2483

Bills, W. E.

PRACTICAL PROBLEMS OF AIR FORCE OPERATIONS UNDER CLIMATIC STRESS. – In: Spector, H. and M. S. Peterson. (ed.), Nutrition under climatic stress . . . , p. 4-8; discussion, p. 15-18. Nat. Acad. of Sci.–Nat. Research Council and Adisory Board

on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 UNCLASSIFIED

Climatic stress has become a less significant factor at this time due to the adequate nutritional levels and satisfactory air- and ground-feeding techniques, as well as advances in protective measures. Air Force survival situations, however, constitute an important exception. The present survival packets of concentrated food are inadequate since they were originally intended to maintain physical condition and morale of the flyer near the place of bailout for approximately ten days until search and rescue. Since the Korean conflict, the airmen downed in combat zones in a non-productive environment must first be successful in evading and escaping the enemy. Consequently, higher rates of caloric expenditure are involved with a corresponding nutritional imbalance. Also, if the future aircraft designs and operational plans increase the stress factors, further study will be required to raise human tolerances to heat or to space and to devise nutritional techniques to maintain flying efficiency.

2484
Bilodeau, E. A.,
and I. M. Bilodeau
THE CONTRIBUTION OF COMPONENT ACTIVITIES TO THE TOTAL PSYCHOMOTOR TASK. — Jour. Exper. Psychol., 47 (1): 37-46. Jan. 1954. DLC (BF1.J6, v. 47)

Data for two multidimensional tracking tasks, analyzed by components and total task, were presented in an introductory analysis of the relative contribution of components to the total task. Whether the total task represented two or three components, the analysis (by trials) suggested that, as a first approximation, time of scoring in one component was essentially independent of times of scoring the remaining components. The hypothesis of independence was tested by multiplication of the separate proportions of time on target and comparing the resulting value with that obtained by observation of the proportion for the total task. The comparison showed that fairly accurate prediction of total-task means and variances can be made, although small but systematic deviations suggest the need for additional research. The analysis brought out the implication that total-task performance can be improved by a redistribution of the on-target component proportions. Thus, for example, for a two-component task, raising the proportion for one relatively low component at the expense of the second will raise the proportion of the total or criterion. In this way it is suggested that overall proficiency on some tracking tasks might be improved without raising the subjects general skill level. Methods for bringing about redistributions are still untested. (Authors' summary)

2485
Bilodeau, E. A.
RATE RECOVERY IN A REPETITIVE MOTOR TASK AS A FUNCTION OF SUCCESSIVE REST PERIODS. — Jour. Exper. Psychol., 48 (3): 197-203. Sept. 1954. DLC (BF1.J6, v. 48)

Five groups of subjects practiced cranking as fast as possible for ten 30-second trials. Practice trials were distributed by interpolating either 0, 10, 30, 90, or 180 seconds of rest between trials. In general, rate of cranking decreased as a function of practice time or of number of previous practice trials. At all points each rest group was appropriately ranked from that with longest interpolated rest to that with least interpolated rest. Recovery associated with the first rest was an increasing and negatively accelerated function of rest duration. With successive rest periods, however, there was a progressive increase in the amount of recovery for the shorter interpolated rest periods and a progressive decrease for the

longer resting periods. An extrapolation from data, which was later verified, suggested a point at which recovery might be independent of all four rest durations. The greatest difference between the experimental groups and the no-rest control group occurred late in practice, while the most marked adjustment in difference between groups took place early in practice. It is suggested that during the initial period of practice there is a rapid adjustment in rate of cranking, and that with successive additional periods of practice and rest there is but a slight further adjustment in the pacing effect. (Author's summary, modified)

2486
Binet, L.,
M. V. Strumza, and J. Lévy
[EFFECT OF HYPOXIA COMBINED WITH MODERATE HYPERCAPNIA ON THE INTELLECTUAL FACULTIES OF MAN] Effets de l'hypoxie associée à une hypercapnie modérée sur les fàcultes intellectuelles de l'homme. – Comptes rendus de l'Académie des sciences (Paris), 239 (1): 11-14. July 5, 1954. In French.
DLC (Q46.A14, v. 239)

Medical students of both sexes were subjected to hypoxia and hypercapnia by breathing a gas containing 14.5% oxygen and enriched with 1% carbon dioxide. After 5 minutes of inhaling this mixture, a Spearman test of 6 minutes was taken, and after a rest of 5 minutes, during which the inhalation was continued, the Faverges test was given. The results of the Spearman test were 22.73 ± 3.21 with air and 15.75 ± 3.35 with the gas mixture, t = 1.56, which means that the intellectual disturbance was either very weak or unobservable. The Faverges test showed 13.66 ± 1.13 with air and 12.76 ± 0.91 with the mixture t = 0.74, which is statistically not significant. One, therefore, may say that the presence of 1% carbon dioxide in an atmosphere of 14.5% oxygen, far from causing any additional intellectual perturbance, may even exert a favorable effect upon intellectual performance, at least for the short time during which the tests were carried out.

2487
Binet, L.,
M. V. Strumza, and J. Levy
[MODERATELY HYPERCAPNIC HYPOXIA AND THE INTELLECTUAL FACULTIES OF THE NORMAL PERSON] Hypoxie modérément hypercapnique et facultés intellectuelles de l'homme normal. – Médecine aéronautique (Paris), 9 (4): 497-498. 1954. In French. DLC (TL555.M394, v. 9)

Young medical students were given a series of intelligence tests after breathing air mixtures containing 18.2% O_2, 16.4% O_2, and 14.5% O_2 with an added 1% CO_2, respectively. It was found that mental performance had deteriorated less upon breathing the 14.5% O_2/1% CO_2 mixture than after inhaling the 16.4% O_2 mixture. This suggests the conclusion that an addition of CO_2 alleviates the detrimental effects of anoxia on mental performance. The findings apply to exposure times of the order of three quarters of an hour.

2488
Binet, L.,
and M. V. Strumza
[EXPERIMENTAL CHANGES IN THE DURATION OF PRIMARY ANOXIC APNEA] Modifications expérimentales de la durée de l'apnée primaire anoxique. – Comptes rendus de l'Académie des sciences (Paris), 239 (17): 1013-1015. Oct. 27, 1954. In French.
DLC (Q46.A14, v. 239)

In the course of inhalation of air with very low oxygen content the respiration undergoes first a phase of excitation, then of depression; the rhythm of breathing slows and the depth of inhalation decreases, until finally the respiratory movements stop. Experiments were made on 115 dogs, anesthetized with chloral hydrate, which breathed oxygen-deficient air while their blood pressure was measured on the femoral artery. The effect

of the following pharmacodynamic agents administered intravenously upon onset and duration of apnea was studied: (1) an antihistaminic agent (dimethylamino-2'-propyl-1'-N-dibenzo-parathiazine chlorhydrate) produced the most prolonged apnea (198 sec.); (2) a respiratory analeptic (N, N'-dibutyl N,N'-dicarboxyl-morpholide-ethylene-diamine) did not show any effect; (3) ephedrine and its derivatives doubled and even tripled the respiratory activity; (4) caffeine did not show any effect; (5) psychamines such as phenyl-1-amino-2-propane significantly reduced the duration of apnea; and (6) atropine suppressed the apnea.

2489
Binet, L.,
and M. V. Strumza
[ON PRIMARY ANOXIC APNEA] Sur l'apnée primaire anoxique. — Journal de physiologie (Paris), 46 (1): 253-254. 1954. In French. DNLM

Primary anoxic apnea appears to be a respiratory inhibition of vagal origin at the time sympathetic tonus disappears. Under the effect of anoxia, the reflex inhibitor of pneumogastric origin disappears and the respiratory centers take over its activity. This activity is directly modified by anoxia before complete cessation of respiration.

2490
Birge, A. C.
LABORATORY STUDIES FOR EVALUATING THE BIOLOGICAL EFFECTS OF PRIMARY COSMIC RADIATION. — Jour. Aviation Med., 25 (4): 326-330. Aug. 1954. DLC (TL555.A1A4, v. 25)

A review is presented of the established facts concerning primary cosmic radiation and its biological effects. The author discusses the energy transferred by ionizing particles of primary cosmic radiation (protons, deuterons, alpha particles, carbon-nitrogen-oxygen group of nuclei) into living tissues through which these particles pass. The ratio between the dose of standard X-radiation and the dose of a different type of radiation, when both produce the same biological effect, is called the Relative Biological Effectiveness of a specific radiation.

2491
Birmingham, H. P.,
A. Kahn, and F. V. Taylor
A DEMONSTRATION OF THE EFFECTS OF QUICKENING IN MULTIPLE-COORDINATE CONTROL TASKS. — Naval Research Lab., Washington, D. C. NRL Report no. 4380, June 23, 1954. i + 7 p. AD 34 703
PB114750

The present experiment was performed to determine whether "quickening" of the control loops will enable the human operator to perform more controller tasks concurrently than when the control loops were not quickened. A four-coordinate tracking task was employed. The subjects manipulated two joysticks to keep within view two target dots on a two-gun cathode ray tube. Each dot was free to move in both the x and y coordinates. The subject's success in performing this multiple-coordinate task with "quickening" was compared with his results when he attempted to track in only one or two coordinates without "quickening". The results show that a majority of the subjects were able to perform the "quickening" tasks perfectly the first day of the experiment. The same subjects were never able to control the dot in two dimensions; however, several learned to control the dot in one coordinate. It is suggested that the application of human engineering principles to a man-machine system may minimize certain training and selection problems. (From the authors' abstract)

2492
Birmingham, H. P.,
and F. V. Taylor
A HUMAN ENGINEERING APPROACH TO THE DESIGN OF MAN-OPERATED CONTINUOUS CONTROL SYSTEMS. —

Naval Research Lab., Washington, D.C.
NRL Report no. 4333, April 7, 1954.
iv+28 p. (Project no. NR 513-050).
AD 30 879 PB114017

Empirical evidence suggests that, at least for short periods of activity, the simpler the tasks imposed upon the human operator of a control system the more precise and less variable become his responses. This leads to the view that optimal man-machine control system performance can be obtained only when the mechanical components of the system are designed so that the human need act only as a simple amplifier. Ways and means are described for achieving such design through "unburdening" (relieving the operator of the task of acting as an integrator) and "quickening" (providing the operator with immediate knowledge of the effects of his own responses). A "stimulus-response" analysis is made of the concepts of unburdening and quickening. It is argued that in those man-machine system arrangements which require that the operator behave as nothing more complicated than a simple amplifier, a condition of "stimulus-response integrity" may be said to exist. Only under this condition do the responses which the man is called upon to make bear an invariant and proportional relationship to the instantaneous amplitude values of the visual errors (stimuli). It is suggested that the choice of a pursuit or compensatory type display is contingent upon the extent to which stimulus-response integrity has been achieved in the system under consideration. (From the authors' abstract)

2493
Bizcarrondo Echevarria, J. M. 1953
[ASTRONAUTICS: THE INHABITABILITY OF THE PLANETS] Astronautica: la habitabilidad de los planetas. — Revista de aeronautica (Madrid), no. 154: 690-697. Sept. 1953. In Spanish. DLC (TL504.R516, no. 154)

Life conditions on the planets of the solar system are investigated in relation to prevailing physical and chemical factors, such as atmospheric density, climatic conditions, constituents of the atmosphere, etc.

2494
Bjurstedt, H.
AEROMEDICAL RESEARCH IN SWEDEN. — Shell Aviation News (London), no. 197: 7-8. Nov. 1954.
DLC (TL501.S55, no. 197)

The purpose and scope of the activities of the Swedish State Research Committee on Aviation Medicine (founded in 1946) are outlined. The Committee, a civilian organization under the Ministry of Education and Ecclesiastical Affairs, is composed of distinguished physiologists and of representatives from the Air Force and Civil Aeronautics Board of Sweden. The Committee is primarily engaged in studies of the physiological and pathological effects of flight on the human organism and in the development of protective measures and equipment. It coordinates the activities of the Faculty of Medicine of the Karolinska Institute, the Institute of Physical Education in Stockholm, and the University of Lund, and supplies their laboratories with funds and equipment to carry on their research activities. — The paper concludes with a description of some of the outstanding research facilities and of the research tasks carried out in Sweden during recent years.

2495
Black, J. W.
AN APPLICATION OF SIDE-TONE IN SUBJECTIVE TESTS OF MICROPHONES AND HEADSETS. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr-22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 20, Feb. 1, 1954. 5+4 p. (Project Report no. NM 001 064.01.20). AD 35 225 PB114247

Twenty-four subjects attempted to repeat a phrase and to establish by control of the vocal level a level of side-tone that matched the level of the stimulus phrase that was heard. The experimental procedure followed the Method of Average Error. Alternative headset-microphone combinations represented broad-band and narrow-band transmission. The subjects tended to speak at a higher level than they should have to match the stimulus. The error was greater in noise than in quiet and greater in broad-band equipment than with narrow-band. (Naval School of Aviation Medicine abstract)

2496
Black, J. W.,
and G. C. Tolhurst
INTELLIGIBILITY AS RELATED TO THE PATH OF AIRBORNE SIDE-TONE. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr-22525); and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 064.01.34). Joint Project Report no. 34, Nov. 15, 1954. 8 p. AD 51 867 PB118712

Panels of 15 experimental subjects each participated in the experiment. The object was to find whether changes in the external side-tone channel produced effects measurable in terms of relative intelligibility scores. The variables included (a) the binaural application of ear defenders by the speakers, (b) monaural applications of ear defenders with the open ear both facing and not facing a reflecting surface, and (c) convex and concave reflectors near the ears. The assumption under test was that both the blocking of the airborne side-tone and the concurrent amplification of bone-conducted side-tone would affect vocal level and intelligibility scores. Differences between pairs of scores indicate that the monitoring system that determines the level in natural speaking is responsive to the path of the airborne signal. In conditions of quiet and in natural speaking, the signal is probably louder to the speaker than is the bone-conducted component of voice.

2497
Black, J. W.,
and S. N. Morrill
THE PITCH OF SIDE-TONE. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr-22523); and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 064.01.31). Joint Project Report no. 31, Oct. 15, 1954. 11 p. AD 50 295 PB116530

An investigation relating to the question of whether a listener and a talker hear the same pitch when both are listening to the talker's voice was conducted. Thirty-two male experimental subjects, including 29 trained musicians, attempted to adjust the pitch of electroacoustically reproduced vowels to agree with the pitch of the same vowel currently sustained by the same subject. Adjustment of pitch was achieved through altering the frequency of the voltage to the motor of the playback tape unit. Adjustments occurred at each of four sound pressure levels. Typically the matchings indicated that the subjects heard their own voices during vowel production as being higher in pitch than an externally generated sound of like sound pressure level and quality. (Authors' summary)

2498
Black, J. W.
THE RELATIVE EFFECTIVENESS OF BRIEF INSTRUCTIONS TO ACHIEVE LOUD SPEECH. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr 22525); and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 064.01.37). Joint Project Report no. 37, Dec. 15, 1954. iii+4 p. AD 62 322 PB117616

Six sets of instructions were given to readers of speech intelligibility tests. One set was limited to standard directions for the test. The other five contained a special sentence that was pointed toward eliciting increased vocal

level. All of the special instructions were effective, both in yielding increased sound pressure and increased scores in intelligibility. The most effective ones included direct references to shouting and loud talking. (Author's summary)

2499
Blaisdell, C. T.

TOXICITY OF CERTAIN ENGINE OILS, HYDRAULIC FLUIDS, AND BASE OILS FOR THE COMPOUNDING OF BOTH HYDRAULIC FLUIDS AND ENGINE OILS. — Army Chemical Center. Chemical Corps Medical Labs., Md. Report no. 256, March 1954. iii+20 p. AD 32 229 UNCLASSIFIED

The toxicity of 13 compounds widely used in hydraulic fluids and engine oils was determined for rabbits and rats and was found to be relatively low as manifested by intravenous LD_{50}'s between 0.05 cc./kg. and 1.5 cc./kg. The hazard to humans incurred by swallowing these compounds would appear almost negligible in view of the fact that, based on experiments with rats, an average size man (70 kg.) would have to ingest 174 cc. of the most toxic compound in order to obtain an LD_{50} dose. The hazard from an accidental splash in the eye of one of these compounds appears to be slight. Symptoms would be expected to remit spontaneously. The chief hazard involved in the use of these compounds would appear to necessitate continued cutaneous exposure (erythema, and hardening and cracking of the skin on prolonged contact). However, all of these changes appear reversible and will probably disappear if exposure to the compounds is discontinued. (Author's conclusions, modified)

2500
Blake, R. R.,
J. S. Mouton, and B. Fruchter

THE CONSISTENCY OF INTERPERSONAL BEHAVIOR JUDGMENTS MADE ON THE BASIS OF SHORT-TERM INTERACTIONS IN THREE-MAN GROUPS. — Jour. Abnormal and Social Psychol., 49 (4): 573-578. Oct. 1954. DLC(RC321.J7, v. 49)

This paper deals with the reliability of social judgments based on direct assessment of subjects engaged in short-term interaction. The experimental plan called for the direct assessment and observer evaluation of the social and personal characteristics of the same 33 subjects in two completely independent interaction situations. Changes between the two group situations included the task on which the members worked, the composition of the groups, and the identity of the observers. On completion of each task, group members were asked to fill in a direct-assessment questionnaire on which they judged their own behavior and that of the other two group members on a ranking basis. The observers judged the behavior of the group members using the same questionnaire. The results confirm the proposition that reliable judgments of short-term interaction can be made even when the two situations are different. Items that permit consistent assessment from both the between- and within-sessions points of view include leadership, contribution to group decision, and dominance. Also of interest is the finding that subjects' judgments of their own behavior, a type of data frequently disregarded, are related significantly to the judgments made by observers and other group members and therefore merit further investigation for possible utility. These results support the view that direct-assessment data can serve as one basis of evaluating personal and social characteristics that cannot be satisfactorily measured by other techniques. (Authors' summary, modified)

2501
Blockley, W. V.,
J. W. McCutchan, and C. L. Taylor

PREDICTION OF HUMAN TOLERANCE FOR HEAT IN AIRCRAFT: A DESIGN GUIDE. — Univ. of California, Los Angeles (Contract AF33(616)32);

issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-346, May 1954. x+50+101 p. (RDO no. 696-69). AD 47 084 PB119018

This report represents a summarization of the present state of knowledge of man's response to the stress of hot environments, referred primarily to the aircraft situation. Included are the means to evaluate the net thermal effect of the diverse physical factors comprising the thermal environment of man, so that all combinations of these quantities may be compared on a common scale of reference. Graphical aids to computation are provided, permitting rapid calculation for standardized or typical conditions. The final expression of thermal effect is in terms of a time duration, arrived at by means of a general body parameter, rate of heat storage. Prediction estimates are provided both for safe tolerable duration of stress and for duration of unimpaired psychomotor performance as a function of body heat storage rate; both design limits are based on the minimum times which have been observed in experiments on normal healthy young men. A series of appendices is provided, which outlines the theoretical considerations and experimental data upon which the charts and procedures for tolerance prediction are based. (Authors' abstract)

2502
Blockley, W. V.,
J. W. McCutchan, J. Lyman, and C. L. Taylor
HUMAN TOLERANCE FOR HIGH TEMPERATURE AIRCRAFT ENVIRONMENTS. — Jour. Aviation Med., 25 (5): 515-522. Oct. 1954.
DLC (TL555.A1A4, v. 25)

Essentially a condensation of item no. 2501.

2503 1952
Boag, T. J.
THE WHITE MAN IN THE ARTIC: A PRELIMINARY STUDY OF PROBLEMS OF ADJUSTMENT. — Amer. Jour. Psychiat., 109 (6): 444-449. Dec. 1952.
DLC (RC321.A52, v. 109)

The article discusses, among other subjects, psychological stresses derived from isolation of small groups, consisting usually of men only, without facilities for recreation, entertainment, and social intercourse, living on a monotonous diet and doing work in which they are not greatly interested.

2504
Bober, S.
[THE BALLISTOCARDIOGRAPHIC CURVE UNDER THE INFLUENCE OF EFFORT] Zachowanie sie krzywej balistokardiograficznej pod wpływem wysiłhu. — Acta physiologica polonica (Warszawa), 5 (3): 291-301. 1954. In Polish, with English summary (p. 300).
DNLM

A new method of functional investigation of the circulatory system in the form of an effort ballistogram has been elaborated. Preliminary experiments established four types of ballistocardiographic effort curves: Type I — with a minimum initial enlargement of IJK deflections followed by return to constant value; Type II — with a longer lasting (7-12 minutes) enlargement of IJK deflections; Type III — with continually but slowly decreasing IJK deflections after an effort; and Type IV — with a considerable decrease of IJK deflections after an effort, followed by their return to the initial state in 20 minutes. The author presents an analysis of effort ballistocardiograms in 20 cyclists of the National Cadre staying at the prepatory camp before the Peace Race. The ballistocardiographic curves in well-trained cyclists were contained within the first three types, whereby a curve of Type I certifies a state of good training, in accordance with electrocardiographic traits of "good form"; Type III may be a variant of a state of "bad training". An abnormal ballistocardiogram in a sportsman with a normal electrocardiogram,

even after effort, if proof of a non-specific circulatory disorder. Contrary to the norms accepted in the physiology of sports it was possible to prove by means of ballistocardiography that the time in which the circulation returns to normal in trained sportsmen after a physical effort is considerably longer than 2-3 minutes. (Author's summary, modified)

2505
Boeles, J. T. F.
THE INFLUENCE OF ANOXIA AND SUBSEQUENT REANIMATION ON THE EXCITABILITY OF THE UPPER MOTOR NEURON AND THE MOTOR UNIT. — Acta physiologica et pharmacologica neerlandica (Amsterdam), 3 (3): 397-419. Oct. 1954. In English.
DLC (QP501.A3, v. 3)

In pentobarbital - Na - anesthetized cats the changes in excitability of the first motor neuron and of the components of motor unit were determined with the aid of chronaxy measurements during subacute anoxic anoxia (induced by breathing a mixture of 95.5% nitrogen and 4.5% oxygen) and subsequent reanimation. The results are as follows: (1) The excitabilities of the sciatic nerve and the gastrocnemius muscle do not show changes until the duration of cardiac arrest has exceeded 15 minutes, after which reanimation is no longer possible. (2) The subordination chronaxy of the sciatic nerve in normal and spinal animals increases or decreases 2-4 minutes after the onset of anoxia; after respiratory arrest has developed, it increases for 4 minutes following cardiac arrest (in spinal animals the alterations are quantitatively slighter). (3) The excitation time of the motor area of the cerebral cortex decreases for 1-3 minutes after the onset of anoxia, after which it increases; as a result of this increase, the motor area becomes inexcitable within 15-20 seconds; this inexcitability is irreversible if respiratory arrest has persisted for longer than 5 minutes. (4) The E. E. G. is more resistant to anoxia than the E.C.G., after an initial increase in frequency the former gradually fades away, while the frequencies and amplitude decreases. And (5) the recovery of excitability and the return to normal values during reanimation are slower the longer anoxia has been present. The E.E.G. shows slow frequencies at first, which gradually become more rapid. (Author's summary, modified)

2506
Bogaert, E.
[EXPERIMENTAL STUDY OF THE BEHAVIORAL CHANGES FOLLOWING ACUTE ANOXIA IN THE RAT] Etude experimentale chez le rat des modifications du comportement consecutives à des anoxies aiguës. — Comptes rendus de la Société de biologie (Paris), 143 (15-18): 1387-1389. Aug.-Sept. 1954. In French.
DLC (QP1.S7, v. 143)

Rats were trained to search for food in a maze following a 24-hour fast and then subjected to simulated altitudes ranging from 5,000 m. to 9,500 m. in a decompression chamber. After 1 hour the rats were recompressed and their performance in the maze was observed. No error in performance was made; however, a diminished rate of activity proportional to the degree of decompression was noted. Rats subjected to repeated decompression also showed minor behavioral changes in the maze.

2507
Bolt, R. H.
AIRCRAFT NOISE AND ITS RELATION TO MAN. — Massachusetts Inst. of Technology. Acoustic Lab., Cambridge. [1954]. 19 p. AD 33 480
UNCLASSIFIED

This is a paper presented at the Annual Flight Propulsion Meeting of the Institute of the Aeronautical Sciences in Cleveland, Ohio, March 12, 1954. The problem of aircraft noise is

analyzed in relation to the following factors: (1) source of noise; (2) paths of transmission; and (3) the physiological and psychological effects on individuals and communities. A formula is presented to predict acoustic power levels of jet engines in relation to their design. Acoustic power level spectra and sound level contours around a jet aircraft are represented graphically. In analyzing aircraft noises, allowance has to be made for the path traversed by the sound waves and such intervening factors as wind, ground features, etc., which influence frequency, noise level and direction of flow. Thus, against-the-wind flights will result in a lowering of sound levels, with a maximum lowering of 25 db. reached at an elevation of 2000 ft. and a frequency range of 600 to 1200 c.p.s. A quantitative evaluation of "residential community reactions" to aircraft noise can only be approximated by statistical analysis, using arbitrary and empirical "response" factors. The results of such an investigation are plotted on a curve.

2508
Bondarenko, M. F.
[ELECTROPHORETIC STUDY OF MUSCLE PROTEIN FRACTIONS. COMMUNICATION II. EFFECT OF ANOXIA ON THE PROTEIN COMPOSITION OF HEART MUSCLE] Elektroforeticheskoe issledovanie belkovykh fraktsiĭ myshts. Soobshchenie II. Vliianie anoksiĭ na belkovyĭ sostav serdechnoi myshtsy — Biulleten' eksperimental'noĭ biologii i meditsiny (Moskva), 38 (11): 43-46. 1954. In Russian. DLC (R91.B56, v. 38)

Experiments were performed on rabbits subjected to atmospheric pressure reductions in a decompression chamber, equivalent to an altitude of 10,000 m., or the equivalent of 198.14 mm. of mercury, over a period of 7-10 minutes. Rabbits were kept under such lowered barometric pressure for 60 minutes, making electrocardiographic records at definite intervals. At the end of 60 minutes the rabbits were rapidly brought to normal atmospheric conditions and the heart excised within 6 to 10 seconds, rapidly frozen, comminuted, and ground to a powder, which was extracted with a 0.5 M. solution of KI. Total N was determined by the Kjeldahl method, and the extract dialyzed for 10 hours in a phosphate buffer of pH 7.4 and 0.35 ionic strength. Electrophoretic protein fraction partitioning was made with a Thisselius-Swenson apparatus. Under conditions of oxygen insufficiency, all rabbits showed a considerable fall in the rhythmic heart contraction rate, a lowering in the voltage of the electrocardiographic crests, and a leveling of the T crest; in some cases, the T-wave assumed a negative direction. Electrophoretic records showed a fall in the contractile myosine to 42.4% and an average 39.4% increase in myogen, while the myoalbumin fraction remained unchanged. Changes in the protein fractions had no effect on the total heart muscle protein content under conditions of anoxia. Anoxia had no effect on the rate of electrophoretic mobility of protein fractions.

2509
Bonfiglio, G.,
and R. Virgili
[HISTOLOGICAL FINDINGS IN THE CENTRAL NERVOUS SYSTEM OF RABBITS SUBJECTED TO REPEATED ANOXIA IN A DECOMPRESSION CHAMBER] Reperti istologici nel sistema nervoso centrale di conigli sottoposti a ripetute anossie in cassone pneumatico. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 46-59. In Italian, with English summary (p. 59).
DNLM (W3.C0943a)

Rabbits subjected to repeated anoxia in a decompression chamber (simulated altitude of 8,000 meters) demonstrated the following principal histological changes in the central nervous system: (1) arterial spasms, venous dilatations,

perivasal edema; (2) intense and diffuse astrocytic gliosis of the white matter, and (3) multiple changes in nervous tissue.

2510 1953
Bonnardel, R.
[THE R.C.B. TEST (TEST OF COMPLEX REACTIONS)] Le test R.C.B. (test de réactions complexes). — Travail humain (Paris), 16 (3-4): 267-273. July-Dec. 1953. In French.
DLC (T58.A2T7, v. 16)

Various psychological phenomena such as learning, retroactive inhibition, perseveration, rigidity-flexibility, and functional plasticity were studied with the test of complex reactions. This test utilizes combinations of stimuli and responses in varying degrees, and may be applied to the selection of personnel.

2511
Bonnel, P. H.
[TRANSMISSION OF HUMAN, ANIMAL, AND PLANT DISEASES BY INSECTS IN AIR TRAVEL] Transmission des maladies humaines, animales et végétales par les insectes dans le trafic aérien. — Concours médical (Paris), 76 (31): 2983-2984, July 31, 1954. In French. DNLM

The dissemination of certain diseases from one continent to another has been facilitated during recent years by the considerable increase in air traffic. Many of these diseases are transmitted by insect vectors which find lodging in the cabins, wheelwells, and on the body of the aircraft. This paper enumerates the insect vectors of some diseases and discusses the responses and behavior of insects during airplane flight. Various methods for the disinsectization of aircraft are mentioned.

2512
Booker, W. M.
J. R. Tureman, F. Da Costa, J. Poulson and S. Mitchell
METABOLIC RELATION OF ASCORBIC ACID, GLUTATHIONE AND ADRENOCORTICAL HORMONE IN SURVIVAL OF MICE DURING COLD STRESS [Abstract] — Jour. Clin. Endocrinol. and Metabolism, 14 (7): 819-820. July 1954.
DLC (RC648.E45, v. 14)

Ascorbic acid and glutathione are effective in increasing the survival time of intact mice subjected to cold stress, but are poorly effective in adrenalectomized mice, in which condition it is well known that adrenocortical hormones are effective. Varying doses of glutathione (2 mg. to 200 mg. per 100 g. of body weight) were tried on intact and adrenalectomized mice. Ascorbic acid was used in a dosage of 20 to 100 mg. per 100 g. of body weight. Cortisone was used in a dosage of 1 mg. per 100 g. of body weight. It appears that combinations of ascorbic acid and cortisone are more effective in increasing the survival time of adrenalectomized mice than combinations of glutathione and cortisone. Likewise the oxygen uptake is greater in the cortisone or cortisone-ascorbic acid groups than in the glutathione and glutathione-cortisone groups. Liver tissue and whole body oxygen uptake experiments show that ascorbic acid, glutathione and cortisone are more effective in increasing the oxygen uptake in intact animals than in adrenalectomized animals at room temperature. It is of great interest that adrenalectomized mice subjected to cold show great increase of oxygen uptake over their unstressed controls but their short survival in cold suggests a "limited metabolic reserve." Experiments show that glutathione acts to keep ascorbic acid in its reduced state; but it appears that in the absence of the adrenal hormone, ascorbic acid is very ineffective from a metabolic point of view in increasing the survival of animals subjected to cold. (Quoted in full)

2513
Booker, W. M.,
J. R. Tureman, F. Da Costa, J. Poulson, and S. Mitchell
OXYGEN UPTAKE OF WHOLE BODY AND OF CERTAIN TISSUES IN INTACT

AND ADRENALECTOMIZED MICE SUBJECTED TO COLD STRESS. — Federation Proceedings, 13(1[I]): 15. 1954. DLC (QH301.F37, v. 13)

A metabolic tie-up may exist between ascorbic acid, adreno-cortical hormone, and glutathione; and this may bear an important role in the survival time of intact and adrenalectomized mice subjected to cold stress. Fifteen to 18-g. intact and adrenalectomized mice were used. Unstressed-untreated intact and unstressed-untreated adrenalectomized mice constitute one set of controls; the other being unstressed-untreated intact and adrenalectomized mice. The stressed animals are subjected to cold (42° F) for 1.5 hr. The treated animals received cortisone, ascorbic acid, glutathione or combinations of these substances half hour prior to stress. At the end of the stress period the whole animal or certain tissues of the body (liver, heart) were homogenized in phosphate buffer (pH 7.45) and oxygen uptake was measured according to the Warburg technique. It appears that the oxygen uptake of the whole body or of certain tissues of the body of adrenalectomized animals, treated or untreated, is decidedly lower than that of intact animals in the same categories. The marked increase in the oxygen uptake of the adrenalectomized stress-untreated animals over the unstressed-untreated adrenalectomized animals, when compared with their intact controls, suggests that the adrenalectomized animals may be drawing heavily upon metabolic reserve during the stress period. (From the authors' summary)

2514

Boothby, W. M. (ed.)

RESPIRATORY PHYSIOLOGY IN AVIATION.— School of Aviation Medicine, Randolph Field, Tex. Sept. 1954. ix+189 p. (Project no. 21-2301-0003). AD 49 179 UNCLASSIFIED

See item no. 3442.

2515

Boothby, W. M.,
W. R. Lovelace, O. O. Benson, and A. F. Strehler

VOLUME AND PARTIAL PRESSURES OF RESPIRATORY GASES AT ALTITUDE.— In: (School Aviation Med.). Respiratory physiology in aviation, p. 39-49. Randolph Field, Tex. Sept. 1954. (Project no. 21-2301-0003). AD 49 179 PB 121739

Principles applying to the measurement of pulmonary ventilation and to oxygen equipment for flying personnel are analyzed. In calculating the respiratory minute volume the aspects to be considered are: (1) true respiratory volume can be calculated from the measurement of inspiratory and expiratory gas at a certain temperature, humidity, and barometric pressure; (2) in metabolic rate determination, caloric equivalents can be computed by reducing all gas volumnes to physical standards; this would apply to measurement of O_2 at high altitudes; (3) loss of O_2 and the simultaneous addition of CO_2 in the alveoli result in chemical changes of the respiratory gas; and (4) in the calculation of true alveolar ventilation vs. pulmonary partial pressure, "the respiratory dead space" (i.e. the fraction ineffective in alveolar respiration) has to be deducted from the total respiratory minute volumne. Alveolar gas samples, obtained in man immediately after sudden exposure to altitudes from 30,000 to 50,000 ft. while breathing air, have proved that alveolar O_2 pressure may exceed tracheal O_2 pressure for a short time because of the alveolar N_2 dilution by oxygen emitted from the blood.

2516

Borgatta, E. F. 1953

WHAT NON-COMMISSIONED OFFICERS THINK OF PROMOTION AND REWARD PRACTICES IN THE UNITED STATES AIR FORCE.— Harvard Univ. Lab. of Social Relations, Cambridge, Mass. (Contract AF 33(038)-12782); issued by Human Resources Research Inst., Maxwell Air Force Base, Ala.

Research Memorandum no. 4, Feb. 1953. 11 p. AD 7609 UNCLASSIFIED

A questionnaire was administered to 933 noncommissioned officers (NCO's) to determine the tendency of NCO's to perceive varying amounts of undesirable conditions in the Air Force promotion and reward system. The questions were negatively oriented to elicit criticisms. NCO's in the lower 4 grades listed fewer criticisms than NCO's in the upper 3 grades. Years of service did not explain the results, although NCO's with only a few years of service were not the most critical. Staff sergeants and technical sergeants with more than 9 years of service criticized more than those with less than 9 years. NCO's with the intention of advancing to warrant officer rank were more critical than those not intending advancement beyond master sergeant rank. NCO's who thought adequate opportunities existed for advancement beyond master sergeant were among the less critical. NCO's intending to remain in service for 30 years or more criticised less than others, while those who were anxious to transfer saw more to criticize. The amount of education did not affect the number of factors an NCO would find to criticize. (AD abstract)

2517
Boucher, H.,
J. Bastien, F. Raguenes, and P. Talec
[ACCIDENTS OF JET-PLANE PERSONNEL ON THE GROUND: NOTE ON AN OBSERVATION OF PULMONARY BLAST INJURY] Les accidents du personnel des avions à réaction pendant les points fixes; a propos d'une observation de "blast injury pulmonaire".—Médecine aéronautique (Paris), 9 (2): 169-179. 1954. In French.
DLC (TL555.M394, v. 9)

Two kinds of accidents may occur while the jet plane is on the ground: (1) persons being sucked into the jet engine through the air intake and (2) exposure to the exhaust of the turboreactor. The first type is more frequent and usually fatal, while the latter is less serious. Exposure to the exhaust gases may result in simple burns of the first or second degree without affection of the lungs; or, at shorter distances (8-10 m.), exhaust gases may be inhaled. In the latter case, the injuries to the respiratory organs are much milder than one would expect. However, the clinical and roentgenological findings are quite characteristic. They are described in greater detail.

2518
Bourdillon, T. D.
THE USE OF OXYGEN APPARATUS BY ACCLIMATIZED MEN.—Proc. Roy. Soc. (London) 143 (910): 24-32. Dec. 1954. DLC (Q41.L7, v. 143)

During the British Cho Oyu Expedition in 1952 and the Everest Expedition in 1953 observations were made regarding the use of oxygen equipment by men fully acclimatized to high altitudes. Descriptions of the following three types of apparatus are given: (1) an open-circuit apparatus, (2) a closed-circuit apparatus, and (3) a sleeping set. A detailed account of the use and effect of oxygen apparatus during the Everest expedition is included. The author feels that these expeditions have provided further evidence of the lasting benefit of previous acclimatization to high altitude. It is so marked as to suggest some definite physiological changes. Both types of climbing oxygen apparatus were found very successful and it was felt that they permitted the climbers to cover longer distances in one day. The sleeping set proved very valuable in keeping high altitude deterioration within reasonable limits.

2519
Bourdon
[SOME FACTS CONCERNING THE CLINICAL EFFECTS OF SOUND, VIBRATION, AND ULTRASOUND ON PERSONNEL EXPOSED TO THEIR ACTION] Quelques constatations concernant les effets cliniques des sons-vibrations-ultra-sons sur les person-

nels exposés a leur action.— Société française d'oto-rhino-laryngologie: Congrès de 1952 (Paris), 59 (pt. 1, Rapports): 103-117. 1952. In French. DNLM (W1S0719, v. 59)

The effects other than deafness occurring from exposure to conditions of noise (piston motors, pulsejets, turbojets, and supersonic blowers) were studied in 51 persons by means of clinical examination and interrogation. Three categories, according to state of health, were distinguished among the subjects. Approximately 75% were considered normal, revealing no physical or subjective effects associated with working conditions. Another 20% were found to be suffering from various ailments such as modification in blood urea level, hypertension, arteriosclerosis, eosinophilia, and neutrophilia. The casual relation between these abnormalities and exposure to noise was, however, not conclusive. In 5% of the cases studied, symptoms were observed which were attributed to exposure to noise, since no other cause was indicated. Persistent intense fatigue, emaciation, mild anemia, and a marked acceleration of the blood sedimentation rate were characteristics generally noted in this group, which consisted of young, newly-exposed, and old subjects. It is suggested that an examination of the blood sedimentation rate be included in standard physical examinations of personnel exposed to conditions of intense noise.

2520
Bowers, N. D.
OPINION OF OFFICERS REGARDING ASSIGNMENT TO THE TRAINING COMMAND. — In: (Naval School Aviation Med.), Miscellaneous tests and minor evaluations, p. 18-20. Pensacola, Fla., April 20, 1954. (Project Report no. NM 001 058.25.07). AD 50 299(d) UNCLASSIFIED

Officers were asked to complete a questionnaire when they reported for ground school instruction at the Instructor's Basic Training Unit. The categorization of responses of 103 instructors to the question: "Were you pleased when you were assigned to the Training Command? and Why?" is presented. The analysis showed that more officers are pleased (53% of the total sample of 103) to receive orders to the Training Command than are displeased (47%). (AD abstract)

2521
Boyer, J.
[MEDICAL EXAMINATION OF CIVIL AVIATION PILOTS] L'examen médical des navigants de l'aéronautique civile.— Presse médicale (Paris), 62 (8): 180-181. Feb. 3, 1954. In French. DNLM

A short discussion is presented on the medical examination of flight personnel, with special reference to tests of general aptitude, vision, color perception, and hearing. The value of these tests is noted as applied to pilot selection, certification and licensure of glider and helicopter pilots, private and commercial pilots, and navigators. In addition, only hearing tests are recommended for qualifying radiotelephone operators and pilots who depend only on instruments for flight.

2522
Bradley, J. V.
CONTROL-DISPLAY ASSOCIATION PREFERENCES FOR GANGED CONTROLS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-379, Aug. 1954. iv + 12 p. (Project no. 7182). AD 52 499 PB 111600

Seventy-five male college students and twenty-five human engineering psychologists were given a questionnaire presenting diagrams consisting of three concentrically ganged knobs and three dials which they were told the knobs operate. They were asked which dial they thought should be operated by each of the three knobs. Knob-dial associations which were both strong and relatively unrivaled were found for dial position in a horizontal array (except

when the array is to the left of the knobs), and for dial size. Subjects associated the spatial knob progression, front knob to back knob with the spatial dial progression, left dial to right dial and with the dial size progression, smallest dial to largest dial. Strong, but strongly rivaled, associations were found for dial position in a vertical array and for dial distance from the knob axis. (From the author's abstract)

2523
Bradley, J. V.
DESIRABLE CONTROL-DISPLAY RELATIONSHIP FOR MOVING-SCALE INSTRUMENTS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-423. Sept. 1954. v + 20 p. (Project no. 7182-71514). AD-61 819 UNCLASSIFIED

This report summarizes a series of experiments designed (1) to investigate the effects of certain control-display relationships on making settings with moving-scale instruments, (2) to attempt to find the optimum control to moving-scale display relationship. Two recommendations resulted: (1) Moving-scale assemblies, for use where the operator will never make control adjustments without simultaneously looking at the associated display, should have a dial which rotates in the same direction as its control knob and whose scale numbers increase from left to right. At least two scale numbers should be visible in the display aperture at all times. (2) When the operator may make crucial control adjustments by "blind reaching" (i.e., without looking at the display), moving-scale assemblies should not be used. (Author's abstract)

2524
Brailovskiĭ, IA. Z.
[COCHLEOPAPILLARY REFLEX AND ITS SIGNIFICANCE IN THE EVALUATION OF HEARING FUNCTION] Ulitkovo-zrachkovyĭ refleks i ego znachenie v ekspertize slukhovoĭ funktsii. — Vestnik oto-rino-laringologii (Moskva), 16 (4):25-29. July-Aug. 1954. In Russian. DLC (RF1.V4, v. 16)

The cochleopapillary reflex can be elicited in response to sound in all people with either normal or impaired hearing. Experiments show that this reflex may be used for sound threshold determinations. The absence of the cochleopapillary reflex is an objective sign of deafness. On this basis the cochleopapillary reflex may be employed as an objective hearing examination method. For a thorough and valid hearing examination, the administration of a battery of several basic hearing tests is recommended, among which the examination by means of the cochleopapillary reflex is considered to be a deciding factor. (From the author's conclusions)

2525
Bramati, C.
[PORTABLE APPARATUS FOR O_2 ANALYSIS: MODIFICATIONS AND TECHNICAL NOTES] Apparato portabile per analisi di O_2: modificne e note di tecnica. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 60-63. In Italian, with English summary (p. 63). DNLM (W3.C0943a)

A modified portable apparatus for analyzing the O_2 of airplane inhalators is described and illustrated. In order to eliminate the introduction of environmental air into the O_2 sample, a Y-shaped connection isolated from the apparatus after introduction of the sample has been included, along with a graduated burette for easier reading.

2526
Braungart, D. C.
THE EFFECT OF ULTRASONICS ON THE PERMEABILITY OF A LIVING MEMBRANE TO NA^{22}. — Catholic Univ. of America, Washington, D. C. (Contract AF 33(616)-438); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical

Report no. 54-228, June 1954. vi + 12 p. (RDO No. 695-63). AD 43 187
UNCLASSIFIED

Tests necessary to pursue research on the effects of ultrasound on living cell membranes are discussed. By means of an isotope it was possible to measure the permeability of a living cell membrane to a weak ultrasonic field. Techniques and instrumentation had to be developed. As a result of the experiments described, it has been shown that a weak ultrasonic field does increase the permeability of the living cell membrane of the amoebae in much the same way as do surface active agents, lipase, and thioglycollic acid. (Author's abstract, modified)

2527
Brener Cukier, J.
[ADRENAL STIMULATION IN ACUTE ANOXIA EXPRESSED IN THE VARIATION OF CIRCULATING EOSINOPHILS] La estimulación suprarrenal por la anoxemia aguda expresada en la variación de los eosinófilos circulantes. — Anales de la Facultad de medicina (Lima), 37 (1): 100-133. 1954. In Spanish. DNLM

Adrenal function, as determined by the circulatory eosinophil count, in persons subjected to acute anoxia by living in high altitudes was compared with that of persons living at sea level. In the majority of anoxic persons a decrease in the number of circulating eosinophils was observed, which was caused by adrenal stimulation. The majority of subjects with acute altitude sickness demonstrated more intense eosinopenia, in comparison to normal subjects. This indicates a more intense adrenal stimulation in subjects with altitude sickness, a response related to the intensity of the stimulus. The number of circulating eosinophils in 25 normal young fasting subjects varied between 70-372 per cubic millimeter at sea level. Eosinophils vary spontaneously in a 4-hour interval (8-9 a.m. to 12-1 p.m.), demonstrating a decrease. (40 references)

2528
Brice, D.
THE SIMULATED AEROPLANE. — Aeronautics (London), 31 (5): 32-37. Dec. 1954. DLC (TL501.A5512, v.31)

The development of flight simulators for pilot training is discussed with regard to economy, efficiency, and desirability. American- and British-built simulators are also evaluated.

2529
Briggs, G. E.,
and W. J. Brogden
THE EFFECT OF COMPONENT PRACTICE ON PERFORMANCE OF A LEVER-POSITIONING SKILL. — Jour. Exper. Psychol., 48 (5): 375-380. Nov. 1954. DLC (BF1.J6, v. 48)

Four groups of eight subjects each practiced a lever-positioning skill on ten practice sessions. Group I received ten 2-min. trials of the complete task on each of the ten sessions. The subjects of the other three groups practiced the whole performance on all trials of Sessions 1, 9, and 10 and on Trials 1 and 10 of all other practice sessions. Group II received four trials of practice on the horizontal component and four trials on the vertical component for Sessions 2 through 8. Group III received eight trials of practice on the vertical component only and Group IV eight trials on the horizontal component only for Sessions 2 through 8. There was a clear superiority of whole practice over part practice. No reliable difference in performance were obtained between the three groups that received part practice. In discussing the results, it is suggested that the superiority of whole practice may disappear at high levels of task complexity. (Authors' summary, modified)

2530
Brindley, G. S.
INTRINSIC 24-HOUR RHYTHMS IN HUMAN PHYSIOLOGY, AND THEIR RELEVANCE TO THE PLANNING OF WORKING PROGRAMMES. — Flying

Personnel Research Committee (Gt. Brit.). Report no. FPRC 871, April 1954. 5 p., 5 diagrams. AD 38 989
UNCLASSIFIED

An investigation of the intrinsic and environmental components of some human physiological diurnal rhythms carried out by the Cambridge University Spitzbergen Expedition (1953) is described. In excretory rhythms, all members of the expedition showed some evidence in persistent 24-hour periodicity when living on a 22-hour cycle. This varied much in magnitude, being in some subjects very conspicuous, in some, difficult to detect. Eosinophil counts were found to show apparently random variations too large to allow the diurnal cycle to be clearly defined. An experiment on the effect of prolonged severe exercise is described. The relation to the planning of working programs is briefly discussed. (Author's summary)

2531
Brindley, G. S.
THE SITE OF ELECTRICAL EXCITATION OF THE HUMAN EYE. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 891, Sept. 1954. 15 p. AD 49 692
UNCLASSIFIED

Evidence is given, principally from the spatial distribution of phosphenes obtained with conjunctival electrodes, that in none of the present experiments and probably in no other published experiments do electrical phosphenes result from stimulation of optic nerve fibers, either outside or inside the eye. All the non-macular phosphenes obtained in the present experiments are consistent with their resulting from stimulation of the retina by radial current. It is suggested that the structures stimulated may be bipolar cells, or the parts of rod and cone cells lying inside the external limiting membrane. The sensitivity of the retina to short pulses of radial current is estimated as about 8.3 x 10^{-9} coulomb/cm^2. (Author's summary)

2532
Broadbent, D. E. 1953
NOISE, PACED PERFORMANCE AND VIGILANCE TASKS. — Brit. Jour. Psychol. (London), Gen. Sect., 44 (4): 295-303. Nov. 1953.
DLC (BF1.B7, v. 44)

Two groups of subjects, a "paced" group and an "unpaced" group, were told to continue working on a 5-choice reaction task under the same conditions as a vigilance task, i.e., with the subject working alone in a monotonous environment without cigarettes or watch, as long as possible. For the "unpaced" group the rate of response depended on the subject, as the next stimulus was presented after the response to the previous one. The "paced" group had a fresh stimulus presented automatically every second, which is approximately the average "unpaced" rate. In the paced group the output of correct responses fell off after 10 minutes of work, while in the unpaced group a decrement in output first appeared near the end of an hour's work. The unpaced subjects, however, showed an increase in the number of short pauses of 2 sec. or more in responding after the first 10 min. of work. It is assumed that both groups had such momentary lapses, but the unpaced subjects could compensate by faster work. Addition of a steady noise of high intensity in the main experiment with 18 subjects under unpaced conditions resulted in an increase of errors with time, showning a decrement in performance, the average increase being more than half of the number occurring in quiet.

2533
Broadbent, D. E.
ATTENTION AND MEMORY IN LISTENING TO SPEECH. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A. P. U. 207/54, Jan. 1954. 7 p. AD 37 688 UNCLASSIFIED

Consideration is given to the functions involved in understanding and

initiating response to speech when it arrives at a particular listener on a particular occasion. The role of attention and memory in listening to speech is discussed, and the research in this field is reviewed. (AD abstract)

2534
Broadbent, D. E.
EFFECTS OF NOISES OF HIGH AND LOW PITCH ON BEHAVIOUR. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report A. P. U. 222/54, Sept. 1954. 11 p., 3 plates. TIP U72351
UNCLASSIFIED

Three subjects worked for two sessions in noise at a five-choice serial reaction task (touching of a particular contact with an electrified stylus upon observing the flashing of a light). On one day the noise was restricted to frequencies above 2000 c.p.s., and on another to frequencies below that frequency. The high pitched noise gave more errors in performance, the difference being most important at the highest intensity of 100 db. When reaction times were measured to the same noises, the first reaction of a series with the same type of stimulus was slower when the stimulus was low intensity and low pitched. With high-pitched or high-intensity stimuli this was not so. Sounds more likely to interfere with work also produce a faster reaction with themselves acting as signals. Noise effects are due to competition between various stimuli to control response. (Author's summary, modified)

2535
Broadbent, D. E.
LISTENING BETWEEN AND DURING PRACTISED AUDITORY DISTRACTIONS. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A.P.U. 208/54, 1954. 11 p. AD 37 687
UNCLASSIFIED

A total of 92 subjects participated in a central task involving speech perception and response to a stream of questions. At the sound of a buzzer the subjects were to give a separate reaction to the signal (pressing of a key) and a comparison was made of the performance of individuals with different instructions and degrees of practice at responding to the buzzer. When the extra signal requiring response occurred while listening to speech, the speech was impaired both at the instant of the extra response and also between responses. Previous practice on the extra reaction reduced the errors between but not during the signals for the extra reactions. Previous practice on the combined tasks reduced the interference at the instant of overlapping signals. (AD abstract)

2536
Broadbent, D. E.
THE ROLE OF AUDITORY LOCALIZATION IN ATTENTION AND MEMORY SPAN. — Jour. Exper. Psychol., 47 (3): 191-196. March 1954.
DLC (BF1.J6, v. 47)

Same as item no. 1151 (vol. II).

2537
Broadbent, D. E.
SOME EFFECTS OF NOISE ON VISUAL PERFORMANCE. — Quart. Jour. Exper. Psychol. (Cambridge), 6 (1): 1-5. Feb. 1954.
DLC (QP351.E95234, v. 6)

A group of ten subjects showed impaired performance, when watch-keeping on a display made up of steam-pressure gauges, in 100 db. noise as compared with 70 db. On the easier task of watch-keeping on a display made up of small lights, another group of twenty subjects showed no overall effect of noise. Individual subjects who showed a practice effect on the latter task comparable to that shown by all subjects on the former one, however, also showed a similar effect of noise. In addition, performance on the light-watching became relatively less efficient in noise with continued exposure: and although parts of the task were

still adequately carried out, others were not. The fact that noise effects are thus functions of individual differences, of visibility of signal, and of length of performance in noise, allows us to explain the negative findings of many previous workers. (Author's summary)

2538
Brody, A. W.
CALCULATION OF COMPLIANCE AND RESISTANCE OF LUNGS AND THORAX FROM RECORDS OF PASSIVE EXPIRATION. — Federation Proceedings, 11 (1^{I}): 17. 1954.
DLC (QH301.F37, v. 13)

The technique of Comroe, Nisell, and Nims for demonstrating the mechanical properties of the lungs of apneic subjects to a known pressure. The subject is then permitted to deflate passively, by elastic recoil, while volume or flow is recorded. Inertia is found to be negligible from a study of acceleration. Neglecting hysteresis, the elastic driving pressure, which is proportional to volume, may be equated to the resistive pressure gradient, which Otis and Proctor expressed as $k_1V + k_2V^2$. This leads to an equation in volume and flow. Records of expiration are, however, in terms of volume vs. time (spirograph) or flow vs. time (pneumotachograph). The first equation was therefore transferred to the final form: $c - K_1\log_e V - 2k_2V = K_t$. This equation fits experimental flow curves from both a model lung and from dogs. In one dog, elastance (K) was calculated from flow curves made with and without a known added resistance. An independent value for elastance was available from the pressure-volume curve, The finding of no significant difference (P .3) validates the method. Use of this equation as a criterion of "passive" expiration leads to the conclusion that normal expiration in unanesthetized man is probably not passive.

2539
Brody, S.
EFFECT OF HEAT ON PHYSIOLOGICAL ECONOMY.— In: Spector, H. and M. S. Peterson, (ed.), Nutrition under climatic stress. . ., p. 33-54; discussion, p. 66-69. Nat. Acad. of Sci. — Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 PB 117996

A very brief summary is presented of a series of progress reports on the effects of slowly rising dry-bulb temperatures (50° to 105° F., with incidental notes on declining temperatures 50° to near 0° F.) on milk production and feed consumption, heat production, outer-surface and respiratory vaporization, respiration and pulse rate, rectal and surface temperature, and blood and milk composition of European- and Indian-evolved cattle. Furthermore, the differential effects of high temperature and humidity at high temperatures are compared in cattle and man.

2540
Brooks, C. E.
DATA SENSING AND RECORDING TECHNIQUES ESTABLISHED FOR THE HUMAN CENTRIFUGE. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5306, Jan. 29, 1954. iv + 46 p. AD 133 235 UNCLASSIFIED

The Aviation Medical Acceleration Laboratory has instrumented its principal experimental device, the human centrifuge, with a system that permits the investigator to record, on the stationary structure, data that are sensed 50 ft. away on a subject who may be undergoing accelerative forces up to 40 g, and traveling at a tangential speed of 180 m.p.h. Thorough shielding, carefully designed sliprings, adequate wiring and patching arrangement comprise a data recording system commensurate with the facility provided by the costly and eleaborate centrifuge device. Principal components in the over-all recording system are described, and de-

scriptions of the applications of the more commonly used sensing devices are presented. (AD abstract)

2541
Brown, E. S.

MEASUREMENT OF PHYSIOLOGICAL DEAD SPACE AND ALVEOLAR VENTILATION WITH RAPID CO_2 AND FLOW ANALYSIS. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract AF 18(600)-108); issued by School of Aviation Medicine, Randolph Field, Tex. Unnumbered Report, April 1954. 15 p. AD 54 728 PB 115446

Of the several methods for CO_2 dead-space calculation, the application of the Bohr equation to successive intervals of 0.04 second yields the most precise values. The average CO_2 dead space method is useful if respiratory rate, CO_2 output, and average alveolar pCO_2 are known. Variation of the CO_2 dead space results from changes in tidal volume. It is suggested that tidal volume alters the CO_2 dead space as measured in the expired air by at least two factors. The fraction of the total dead space appearing in expired air depends upon the fraction of the lung effectively ventilated. Independently, the volume of the total dead space is altered by changes in lung volume. Increments in the volume of the bronchial tree related to increments in lung volume produce relatively smaller variations in the dead space. The role of the cardiopneumatographic patterns in alveolar ventilation has been neglected. The cyclic fluctuations in alveolar pCO_2 indicate a "pendelluft" effect which tends to reduce dead space, and renders uncertain the absolute values calculated for lung volume. This effect obviously influences the dynamics of gas exchange during "diffusion respiration." The postulated hyperventilation of lung segments adjacent to the heart would account, in part, for unequal ventilation of various parts of the lung. (Author's summary, modified)

2542
Brown, Frank A.

BIOLOGICAL CLOCKS AND THE FIDDLER CRAB. — Scient. American, 190 (4): 34-37. April 1954.
DLC (T1.S5, v. 190)

Daily variations in the pigment cells of fiddler crabs were studied in a darkroom over a two-month period. The rhythm of color changes followed the day-night-cycle, whether the temperature was kept at 26°, 16°, or 6° C. The author suggests that the fiddler crab has a 12.4 hour metabolic rhythm coinciding with tide intervals, as well as a 24-hour one. A purely metabolic hypothesis for this diurnal mechanism is presented. Once set, the clock continues to run at its characteristic rate, independent of external influences. A change in conditions can stop, slow or reset the clock but does not change its rate. An alternative hypothesis, one which perceives some kind of physical force in the environment hitherto not known to affect living organisms, suggests that the experimental changes do not reset the basic clock but rather shift the specific behavior pattern.

2543
Brown, Fred R.,
and D. Alsher

THE ASSESSMENT OF VISUAL DISTORTION THROUGH AIRCRAFT TRANSPARENCIES. — Jour. Aviation Med., 25 (3): 249-256. June 1954.
DLC (TL555.A1A4, v. 25)

A method of assessing distortion in aircraft transparencies is described. A grid is photographed through the transparency. Any crooked, wavy, or angled lines in the grid photograph indicate distortion of the surfaces of the transparency. Three criteria of objectionable distortion in the transparencies were established by studying the grid photographs: (1) large, localized deviations in the grid lines; (2) general waviness of the lines over a large area; and (3) change and reversal of lines occurring within a selected distance. The area of distortion should be considered in relation to its location within the total transparency area, for some areas

are of more importance to the user than others. Thus, a distortion appearing in the central viewing area would be a much greater hazard to the pilot's view than one which occurred in a marginal area.

2544

Brown, Fred R.,
L. M. Crumley, and D. Alsher

THE DEVELOPMENT OF INSPECTION METHODS AND CRITERIA FOR OPTICAL DISTORTION IN COCKPIT ENCLOSURES. I. A STUDY OF INSPECTION METHODS FOR OPTICAL DISTORTION IN AIRCRAFT TRANSPARENCIES. — Naval Air Experimental Station. Aeronautical Medical Equipment Lab., Philadelphia, Pa. Report no. TED NAM AE-4405, Part 1, May 17, 1954. 21 p., 5 plates. AD 38 352 UNCLASSIFIED

A study was made to determine the most practicable method which will reliably reveal the visually significant variations in optical deviation in aircraft transparencies; and the characteristics of the variations of deviation in transparencies which are most objectionable to pilots. Double-aperture photography of a grid screen (1"x1" squares) is proposed as the simplest and most reliable test to detect such variations of deviation. The proposed method requires that the picture be taken from a position closely approximating the position of the pilot's eyes in the cockpit in order to maintain geometric equivalence of the optical factors. A tentative specification for the method of evaluating the photographs is proposed for validation of the basic technique. The method, the results of which correlate highly with pilot preference of tested windshields, considers as most significant the area of extent of distortion. It is recommended that the proposed method be validated and evaluated in a production situation. (Authors' abstract, modified)

2545

Brown, G. M., and J. Page 1952

THE EFFECT OF CHRONIC EXPOSURE TO COLD ON TEMPERATURE AND BLOOD FLOW OF THE HAND. — Jour. Applied Physiol., 5 (5): 221-227. Nov. 1952. DLC (QP1.J72, v. 5)

A comparative study on hand blood flow and temperature has been carried out on Eskimos in the Canadian Eastern Arctic and on medical students living in a temperate climate. One of the effects of chronic exposure of the individual to cold is a reduction in the ambient temperature required for comfort. At this low ambient temperature, the hand blood flow of the Eskimo is twice that of the white man and the skin temperature of his hand is greater. At any given water-bath temperature, the hand blood flow of the Eskimo is greater. The volume of the hand blood flow of the Eskimo changes more slowly in response to local cold. The degree of spontaneous fluctuation in hand blood flow is greater in the Eskimo and increases in both groups as the local temperature of the hand increases. The alterations which occur in the hand blood flow following chronic exposure to cold would appear to enhance hand function in the cold. (Authors' summary)

2546

Brown, John L.

EFFECT OF DIFFERENT PRE-ADAPTING LUMINANCES ON THE RESOLUTION OF VISUAL DETAIL DURING DARK ADAPTATION. — Jour. Optical Soc. Amer., 44 (1): 48-55. Jan. 1954. DLC (QC350.06, v. 44)

Luminance thresholds for the resolution of various widths of grating line were determined during dark adaptation following light adaptation to luminances of 0.98, 100, 1290, and 11,200 millilamberts. The dark adaptation curves for the finest gratings, representing high visual acuity, start at a high initial luminance and drop to a final steady level after 5 to 10 minutes in the dark, as is characteristic of cone function. Curves for coarser gratings may display both cone and rod portions, or

after light adaptation to low luminances may represent rod function only. The higher the degree of resolution required, the higher the position of the dark-adaptation curve on the log threshold luminance axis. Increasing the level of light adaptation results in higher initial threshold luminances and a more gradual decline to a final steady value. The final steady value of threshold luminance for a given grating size is little influenced by the level of light adaptation. (Author's summary)

2547
Brown, R[obert]H.
THE VISUAL DISCRIMINATION OF VELOCITY AS A FUNCTION OF THE RATE OF MOVEMENT AND OTHER FACTORS. — Office of Naval Research. Naval Research Lab., Washington, D.C. NRL Report no. 4299, Jan. 26, 1954. i+ 10 p. (RDB Project no. 513-050). AD 27 385 PB 113464

Eight subjects were required to report the direction of a spot of white light moving at a controlled speed and exposed for only 0.31 sec. on a black screen. As the speed of stimulus was increased, the frequency of direction detection increased. This frequency of discrimination function was adequately described as a logarithmic normal probability integral of the rate of movement, and the mean and standard deviations served as representatives of the function for a given observer. Practice, fatigue, stimulus order, and dark adaptation before the trial failed to influence the rate of discrimination, but a significant difference between observers was noted. This resulted from observer differences in rate thresholds, part of which was a function of visual acuity; excluding the two observers with 20/30 far visual acuity, the responses of the 6 observers with 20/20 acuity did not differ significantly. (AD abstract)

2548
Brown, Robert H.
THE VISUAL DISCRIMINATION OF VELOCITY AS A FUNCTION OF STIMULUS DURATION AND LUMINANCE. — Office of Naval Research. Naval Research Lab., Washington, D.C. NRL Report no 4372 (Interim Report), May 21, 1954. i+10 p. AD 32 632 PB 114722

Experiments are being conducted to determine systematically how man discriminates velocity and acceleration. Results of these experiments provide for a fuller understanding of the visual processes of the tracker in predicting the motion of a target. The method of experimentation used involves an unequivocal response to visual movement. The observer, presented with a spot traveling at a controlled speed, reports its direction. In this experiment four observers discriminated velocity at eight speeds for each of eight exposure times. The minimal luminance required for the discrimination was determined for each condition. Analysis of the results indicated that the visual discrimination of velocity under the experimental conditions is a single discriminatory event controlled by photochemical activity in the retina. For exposure times less than 0.1 second the discrimination is determined by the product of stimulus luminance and duration. For longer intervals the discrimination tends to be dependent on luminance alone. The results further showed that duration and speed interact with each other as determinants of the discrimination. This finding suggests that distance, the product of duration and speed, is a relevant variable. (Author's abstract)

2549
Brown, W. S. 1952
PHYSIOLOGICAL HAZARD OF NONIONIZING RADIATION. — Lockheed Aircraft Corp. Lockheed Aircraft Service, Burbank, Calif. Document no. SDR 1072, Aug. 20, 1952. 28 p. AD-139 961 UNCLASSIFIED

An analysis is made of the character and intensity of radiation from the radar transmitter. A comparison is made between radioactive-nuclei radiation and radiation produced by a radar system. Experiments were carried out

using rabbits, rats, and raw beefsteak to determine radar radiation hazard. Initially a wave length of 12 cm. and delivering a power concentration of 3 watts per $cm.^2$ was used. Later tests were performed at a wave length of 8 cm. with a power concentration of one watt per $cm.^2$ It was concluded that the effects of this type of radiation on living organisms are primarily those of heat. The areas of greatest vulnerability in living tissue were shown to be those body cavities which are the least supplied by the bloodstream with their resultant poor heat dissipation characteristics, such as the eyes, certain of the internal cavities, and the gonads. It was emphasized that heat resulting from tissue absorption of microwave energy is the only factor to be considered. No conclusion was reached as to what radiation intensities or periods of irradiation constitute a danger to tissue, but it was indicated that a relatively modest amount of radiation intensity is dangerous. The wave lengths at and immediately surrounding 10 cm. were the most dangerous for several reasons, the principal one being the inability of the irradiated subject to detect any sensation of pain, though serious tissue damage might be taking place.

2550
Brožek, J.,
and H. L. Taylor
TESTS OF MOTOR FUNCTIONS IN INVESTIGATIONS ON FITNESS. — Amer. Jour. Psychol., 67 (4): 590-611. Dec. 1954. DLC (BF1.A5, v. 67)

A battery of tests of motor functions, applied in the context of comprehensive studies of "fitness" and of changes in fitness under a variety of biological stresses, was described. It contained two tests of strength, three of speed, and one of coordination, yielding two scores. It was found that motor performance is more susceptible to deterioration under stress than are sensory and intellective functions. Even in the motor area the changes have frequently been small under conditions of severe stress. The complex reaction-time was the only variable which exhibited statistically significant changes in all five stresses. Strength showed greatest decrement in semi-starvation, while speed of tapping, speed of hand and arm movements, and complex reaction-time exhibited largest deterioration in acute starvation combined with hard physical work. A combination of a battery of tests of motor function plus physiological indices of the ability to do hard physical work measures deterioration in the presence of stress better than either approach used alone and provides a better basis for analysis of fitness deterioration. (From the authors' summary)

2551
Bruck, A.,
P. Haas, and W. Ulmer
[AN INFRARED ABSORPTION TRACING DEVICE FOR RAPID, CONTINUOUS MEASUREMENTS OF THE CARBON DIOXIDE CONCENTRATION IN THE EXPIRED BREATH] Ein schnellanzeigender Ultrarot-absorptionsschreiber zur fortlaufenden Messung der Kohlensäurekonzentration in der Atemluft. — Pflügers Archiv für der gesamte Physiologie (Berlin), 259 (2): 142-145. 1954. In German.
DLC (QP1.A63, v. 259)

A tracing apparatus, operating on the basis of infrared absorption, is described, which is able to trace changes in CO_2 concentration for each expiration with a delay of 0.15 seconds. (Authors' summary)

2552
Bugard, M. P. J. 1952
[THE BIOLOGICAL ACTION OF MECHANICAL VIBRATIONS (INFRASOUNDS, SOUNDS, ULTRASOUNDS
L'action biologique des vibrations mécaniques (infra-sons, sons, ultrasons). — Mémorial de L'Artillerie française (Paris), 26 (1): 7-39. 1952. In French. DLC (UF1.M6, v. 26)

A general discussion of the biological effects of mechanical vibrations

and a review of pertinent literature are presented. Two experiments on phases of the problem are described. One of these experiments was an attempt to characterize the sound emitted by various mechanical devices. A piezo-electric microphone connected with an oscillograph and a decibel analyzer were used to record frequency and intensity of sonar vibrations. Analyses were made of the sound emitted by mechanical saws, jet engines, and supersonic blowers under conditions frequently encountered by test personnel. Detailed records of frequency and intensity findings in various cases are presented. In a second experiment, twenty-five subjects working under conditions of noise with intensities sufficient to mask the human voice were studied. Low-frequency vibrations caused general disagreeable sensations in the head, limbs, and thorax or abdomen. Headaches, loss of appetite, general fatigue, and, in nine cases, high-frequency oriented deafness were noted. After from fifteen to thirty days of exposure, some amount of adaptation was noted, but symptoms still persisted. The biological causes of these symptoms remain largely unexplained.

2553
Bugard, P.,
J. Sallé, H. Souvras, P. Valade, and E. Coste
[ON THE ELECTRIC CEREBRAL ACTIVITY OF MEN AND ANIMALS SUBJECTED TO INTENSE NOISE] Sur l'activité électrique cérébrale d'hommes et d'animaux soumis à des bruits intenses. — Comptes rendus de la Société de biologie (Paris), 148 (11-12): 1072-1075. June 1954. In French. DLC (QP1.S7, v. 148)

Electroencephalographic studies were performed on thirty men who had been exposed for extended periods of time to working conditions of intense noise, and who showed symptoms of chronic fatigue. Abnormal encephalograms were recorded on sixteen of these subjects. The proportion of abnormal encephalograms found among the average population, in contrast, is 10-15%. All the abnormal graphs occurred in subjects who had worked under conditions of noise for over two years, and the proportion of abnormalities increased in subjects exposed for five years or more. Correlation was also shown between subjects suffering from severe fatigue, and proportion of abnormal graphs. Thirty-six rabbits subjected to similar experimental conditions again recorded encephalographic abnormalities. Histologic examination of the brains of these animals showed in many cases moderate cortical edema. Upon sagittal section, distension of the vascular sheath and neuronal bodies was noted. Edemic effects were limited chiefly to the frontal, parietal, and occipital regions of the brain. It is suggested that sonar vibrations are capable of acting as traumatic agents.

2554
*Bulatova, N. N. 1953
[SOME CHARACTERISTICS OF THE RESPIRATORY FUNCTION OF BLOOD OF ANIMALS LIVING AT HIGH ALTITUDES] Nekotorye osobenosti dykhatel'noĭ funktsii krovi gornykh zhivotnykh. — Avtoreferat dissertatsii kandidata biologicheskikh nauk, Moskovskiĭ gosudarstvennyĭ universitet, Moskva, 1953. (Referativnyĭ Zhurnal, Biologiia, 1955, Abstract No. 4435).

2555
Bullock, D. H.,
and L. S. Braley
PARAMETERS OF AN AUDITORY MONITORING TASK. — Univ. of Buffalo. Dept. of Psychology, N. Y. (Contract AF 30(602)-574). Scientific Report no. 2, [1954]. (RADC TN 55-73). AD 55 393 PB 126484

The parameters studied were: (1) the informational loading of the audio messages and (2) the rate of information presentation within these messages. The monitoring task required the subjects to discriminate whether the second of two successive dot-dash

sequences comprised a message which was the same or different from the first. The informational value of a message was defined by the number of dot-dash units per sequence, which was equal to bits per sequence (each dot-dash unit being a one-bit item). The 3 levels of informational loading consisted of 2 successive 4-bit, 6-bit, and 8-bit sequences. Combining the 3 information levels and 3 intra-message rates of information yielded 9 complexity-rate combinations. Nine experienced audio monitors served as subjects in this random-block design experiment. Monitoring proficiency was measured by the number of discriminatory errors per block of 50 messages. The mean errors per complexity-rate combination for the subjects showed that an increase in the informational loading and intra-message rates of information produced a progressive decrease in the auditory monitoring proficiency. (AD abstract)

2556
Buresh, IA. 1953
[THE EFFECT OF TOTAL BODY COOLING ON THE SUSCEPTIBILITY TO REFLEX EPILEPSY CONVULSIONS IN RATS AND MICE] Vliianie obshchego snizheniia temperatury na sudorozhnuiu gotovnost' k reflektornoi epilepsii u krys i myshei. — Chekhoslovatskaia fiziologiia (Praga), 2 (4): 357-362. 1953. In Russian.
DLC (QP1.C417, v. 2)

Reflex epileptic seizures cannot be elicited by electroshock in rats and mice the body temperature of which is cooled to 27 - 25°C. The postural and orientation reflexes in response to stimulation by sound begin to disappear at such low body temperatures. Nevertheless, electrical reactions of the cortex of the brain, elicited by sound stimulation, persist at the normal level even at body temperature of 20°C. The amplitude of the spontaneous electroencephalogram becomes evenly and gradually lowered as the body cooling progresses; in unanesthetized animals cooled to 20°C. the electroencephalogram frequency amounts to 15 - 20 per sec. Some speculative assumptions are offered.

2557
Burnum, J. F.,
J. B. Hickam, and H. D. McIntosh
THE EFFECT OF HYPOCAPNIA ON ARTERIAL BLOOD PRESSURE. — Circulation, 9 (1): 89-95. Jan. 1954.
DLC (RC681.A1C5, v. 9)

Hyperventilation studies were conducted on recumbent subjects during one-minute periods of maximal voluntary forced breathing of either room air or a 5% carbon dioxide, 21% oxygen gas mixture. Forearm blood flow, intraarterial pressure, pulse rate, cardiac output, and arterial blood pH and carbon dioxide content were measured simultaneously, and blood CO_2 tension was calculated from the latter. From the results, the following conclusions were drawn: In man, hypocapnia induced by hyperventilation causes a drop in arterial pressure. The calculated peripheral resistance is decreased, indicating a net vasodilatation. The forearm blood flow is markedly increased, and the vascular resistance of the forearm is much reduced. Persons with impaired function of the sympathetic nervous system continue to show these effects. The increase in forearm flow is not prevented by brachial block. These results suggest that hypocapnia acts directly on blood vessels to produce a net over-all vasodilatation and fall in blood pressure, and that this effect is not mediated through the nervous system, as usually supposed. (Authors' summary, modified)

2558
Busch, G., 1953
and K. Wachholder
[THE INFLUENCE OF FATIGUING MENTAL STRESS ON THE FLICKER FUSION FREQUENCY] Der Einfluss ermüdender geistiger Beanspruchung auf die Flimmerverschmelzungsfrequenz. — Arbeitsphysiologie (Berlin), 15 (2): 149-164. 1953. In German.
DNLM

Only eleven of twenty-two subjects exhibited lowered critical flicker frequencies after a day of mental work. In eight subjects significant increases were observed. A comparison with diurnal critical flicker frequency curves at rest showed a cover effect, whereby a decrease in critical flicker frequency may be compensated or even reversed. Similarly, exciting work may cause an increase in critical flicker frequency in spite of fatigue at the end of day. Periodic readings of critical flicker frequency were taken of subjects occupied with purely mental work, i. e., mentally solving arithmetical problems. A three-phase curve was obtained similar to that obtained for physical work, see item no. 2397, characterized by (1) an initial rise, (2) a depression, and (3) a final CFF increase followed by frequent, wide, periodical fluctuations. As the stress was increased by giving more difficult arithmetical problems, the CFF decreased at first rapidly, then the decrease became slower, until finally a plateau was reached. In some cases the plateau stage was followed by a steady rise in CFF. Additional experiments comparing changes of the CFF with self-evaluation by the subjects of their condition revealed that the increase in CFF was due to the following factors: (1) mental excitement, (2) effort to concentrate, and (3) emotional excitement. The multiphasic curve of the CFF is attributed to an interaction of the above factors, in addition to the effects of of adrenalin and excitatory irradiation with the depressing effect of fatigue, decrease in concentration and an antagonistic vagotonic factor. The authors feel that CFF cannot be used as an objective test for fatigue due to the complexity of factors involved, however, it may serve as an index of concentration and other psychological factors affecting working capacity.

2559

Busnengo, E. 1953

[THE VARIATIONS OF CAPILLARY RESISTANCE IN RELATION TO AGE] Le variazioni della resistenza capillare in rapporto all'eta. – Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 64-67. In Italian, with English summary (p. 67).

DNLM (W3.C0943a)

The cuff test and negative pressure test performed in normal subjects (11-20 and 71-80 years of age) showed that capillary resistance decreases with increasing age. Testing capillary resistance, in addition to other tests, is of value in aviation medicine for determining physical efficiency of personnel and in screening any developing or latent pathological processes.

2560

Cahn, T., and J. Houget 1953

[ON THE REGULATION OF THE TWENTY-FOUR HOUR ENERGY EXPENDITURE IN THE RABBIT] Sur la régulation de la dépense énergétique de vingt-quatre heures chez le lapin. – Journal de physiologie (Paris), 45 (1): 67-68. 1953. In French.

DNLM

Rabbits ingesting an excess of food or on a lipid diet demonstrated an increase in 24-hour energy expenditure. Rabbits receiving insulin showed a moderate and transitory increase in energy expenditure with body compensation (increase in 24-hour heat production). Total body heat production was not altered. Insulin-induced increase in energy expenditure was minor in comparison to that caused by food. Animals receiving thyroxin showed a prolonged increase in 24-hour energy expenditure without body compensation. These studies indicate that food is the most important factor in the 24-hour of energy expenditure.

2561

Calì, V. 1953

[ON THE REACTIONS TO AMBIENT HYPERTHERMIA. V. VOLUMETRIC MODIFICATIONS OF THE SPLEEN]

Sulle reazioni all'ipertermia ambientale. V. Modificazioni volumetriche della milza. — Bolletino della Società italiana di biologia sperimentale (Napoli), 29 (8): 1556-1558. July-Aug. 1953. In Italian. DNLM

Splenic contractions were demonstrated by 15 subjects exposed to heat (43°-45°C.) for 30 minutes or for one and two hour intervals. These contractions indicate splenic participation in the hematological modifications caused by excessive heat.

2562
Calloway, D. H.,
and H. Spector
NITROGEN BALANCE AS RELATED TO CALORIC AND PROTEIN INTAKE IN ACTIVE YOUNG MEN. — Quartermaster Food and Container Institute for the Armed Forces, Chicago Ill. Interim Report, Problem 06-14a (Nitrogen metabolism during dietary restriction), May 1954. 11+3 p. (Project: Attainment of Nutritional Reliability 7-84-12-011) AD 33 978
UNCLASSIFIED

The literature pertaining to the influence of caloric and protein intake on nitrogen balance in active young men was reviewed. Approximately 12 grams of nitrogen per day is lost in fasting. Supplying as little as 400 calories from carbohydrate reduces this loss to about 7 to 8 grams per day, but increasing calories to 2800 per day without protein was without further benefit. When only 400 to 600 cal. were consumed, the inclusion of protein in the diet did not reduce the nitrogen deficit, a minimum intake of about 900 cal. being required for utilization of dietary protein. At this caloric level 3 grams of dietary nitrogen was the maximum which could be retained. At 1600-1800 caloric intakes 6 grams of nitrogen were efficiently used. Independent increases of calories or of protein afforded no advantage. A food unit furnishing a minimum of 500 cal., 7 to 8% of which are derived from protein, has been suggested. This unit could be employed in any multiple number with maximum benefit from the protein at each energy level, yet without significant increase in water requirement when only one unit is consumed. (Authors' summary)

2563
Campanelli, L.
[THE MODERN AUDIOMETER AND THE SILENT ROOM WITH REGARD TO THE SELECTION OF VOLUNTARY PERSONNEL OF THE NAVY] Il moderno audiometro e la camera silente nei riguardi della selezione del personale volontario della Marina Militare. — Annali di medicina navale e tropicale (Roma), 59 (1): 58-82. Jan.-Feb. 1954. In Italian, with English summary (p. 80-81). DNLM

Based on physical, experimental, and statistical data the inadequacies of hearing tests utilizing perception of spoken words are discussed; and the advantages and technique of the audiometric method utilizing electro-acoustical devices in a silent room are described. It is recommended that the audiometric method be adopted as the standard for reliable evaluation of hearing prior to selection of personnel.

2564
Campbell, B.
A BIOLOGICAL STUDY OF THE EFFECTS OF THE HEAVY PARTICLE COMPONENT OF COSMIC RAYS. — Jour. Aviation Med., 25 (4): 361-365. Aug 1954. DLC(TL555.A1A4, v. 25)

The author discusses the "giant radiation event" which occurs when a heavy-particle cosmic ray passes through tissues of biological specimens. In the immediate vicinity of the path of the particle through the tissue, the ionization produced is the physical equivalent of as much as 20,000 roentgen units of x-rays. Radiation damage occurs by the introduction of large amounts of free energy which disrupt the chemical processes of the cells.

There are three functional orders within a cell (genes, enzymes, and substrates): genes set the pattern of action of the cells and act as formers of enzyme molecules, which in turn cause the chemical reactions in the substrate by which work is done. Direct and measurable cell damage requires radiation dosages in the millions of roentgen units; alteration in cellular chemistry may be caused by 100 to several thousands of roentgens; however, damage to genes may occur from an extremely low radiation exposure. Cytoplasmic damage is immediately observable; enzyme effect may take several months to occur; and genetic changes may not appear for one or more generations. Those tissues which have the power of regeneration are not likely to be damaged by the heavy particles. Damage, if any, may be expected to occur in the non-regenerative tissues associated with the nervous system.

2565
Campbell, F. W.
THE DEPTH OF FOCUS OF THE HUMAN EYE [Abstract]. — Jour. Physiol. (London), 125 (1): 29P-30P. July 28, 1954. DLC (QP1.J75, v. 125)

A simple but accurate method for measuring the depth of field when the eye is focused for a distance of 50 cm. has been developed using a standard optical bench. The test objects were black disks each subtending a 10 min. visual angle viewed against a white or colored background. At a fixed pupil size the hyperfocal distance was found to increase directly with the $\log^{10}$ of the background luminance. The well-known relationship between luminance and the resolving power of the retina can account for this finding. If retinal illumination is held constant and pupil size is altered the depth of field varies approximately inversely with the pupil diameter. The hyperfocal distance is found to be greater than that predicted by geometric optics at pupil diameters smaller than 2.5 mm. and less than that predicted for pupil sizes larger than 2.5 mm. With small pupil sizes the deviation from theory may be accounted for by the resulting diminution of chromatic aberration fringes. This conclusion is supported by the finding that if the chromatic aberration of the eye is corrected with an achromatizing lens, the observer is able to detect out-of-focus blurring with greater ease. At wider pupil sizes the deviation is explained by the retinal direction effect. Thus the effective pupil size should be used in calculations of depth of field and not the apparent or exit pupil size. Additional proof that the retinal direction effect diminishes the perception of out-of-focus blurring has been obtained by measuring the depth of field with backgrounds of different color but of equal luminance. It may be concluded that the presence of chromatic aberration and the retinal direction effect in the human eye diminish the effect of small refractive errors on visual acuity at wide pupil apertures. (Quoted in part)

2566
Canac, F.,
and B. Bladier
[INJURIOUS EFFECTS OF NOISE REVEALED BY POTENTIALS PICKED UP BY BIOCCIPITAL LEADS] Sur la nuisance du bruit décelée par les potentials recueillis en dérivation bi-occipitale. — Comptes rendus de l'Académie des sciences (Paris), 239 (20): 1313-1315. Nov. 15, 1954. In French. DLC (Q46.A14, v. 239)

Six healthy subjects were exposed with closed eyes to a simple noise of 80 db. ± 10 db. at frequencies between 50 and 10,000 c.p.s. The noise was made by striking an aluminum plate with a standardized hitting machine. Electroencephalographic recordings were made before the noise, a few seconds after, 5 minutes and 15 minutes after the noise. Before the noise the electric activity showed the typical sinusoidal error; 5 seconds after the noise a jagged and irregular curve with characteristic recurrent indentations which were also visible

in the curve plotted after 5 minutes was observed; the curve taken 15 minutes after the noise had returned to its normal sinusoidal form.

2567
Carlson, L. D.
USE OF OXYGEN EQUIPMENT. — In: [School Aviation Med.] Respiratory physiology in aviation, p. 109-127. Randolph Field, Tex. Sept. 1954. (Project no. 21-2301-0003). AD 49 179 PB 121739

The following oxygen systems are reviewed: (1) In the continuous flow system O_2 flows from the regulator at a fixed flow set manually (type A-9) or automatically (type A-11); the leakproof facepiece requires no mask fitting and can be well used in air ambulance operation. (2) The demand system supplies O_2 in the appropriate mixture on demand of the user; negative pressure is required to actuate the valve; on the other hand, economy is an inherent feature of the system. (3) Pressure demand equipment tends to reduce the danger of mask leakage and is operated either manually or by automatic control. The measurement of intrathoracic pressure and mask pressure during normal breathing at various altitudes is an index of the increased O_2 pressure to which the blood is exposed. In jet or rocket flight, a counterpressure or balance pressure breathing system is required. This may be applied by a pressure vest or bladder, a full pressure suit with pneumatic pressurization, or a partial pressure suit (an inflatable vest fed directly from the mask O_2 line, with a pair of close fitting coveralls with pneumatic capstans on the arms and legs). Emergency and bail-out equipment design is based on physiological requirements. Aircraft O_2 installation may be either low or high pressure. Considerable space and weight are saved by using liquid oxygen.

2568
Carnazzo, A. 1953
[ON THE REACTIONS TO AMBIENT HYPERTHERMIA. III. EFFECT OF AMBIENT HYPERTHERMIA ON THE POTASSIUM LEVEL CURVE] Sulle reazioni all'ipertermia ambientale. III. Influenza dell'ipertermia ambientale sulla curva da carico di potassio. — Bolletino della Società italiana di biologia sperimentale (Napoli), 29 (8): 1552-1554. July-Aug. 1953. In Italian. DNLM

Subjects exposed to heat (43°-45°C.) showed a variable increase in blood potassium levels in relation to the same subjects at temperatures of 25°-30°C. Experimental hyperthermia, acting as a body stress, also has a marked effect on adrenocortical activity. Under this condition, it is suggested that blood potassium curve determinations may be indicative of adrenocortical function.

2569
Carnazzo, A. 1953
[ON THE REACTIONS TO AMBIENT HYPERTHERMIA. IV. BEHAVIOR OF URINARY 17-KETOSTEROIDS AND TOTAL CORTICOIDS IN SUBJECTS EXPOSED TO HYPERTHERMIC TRAUMA] Sulle reazioni all'ipertermia ambientale. IV. Comportamento dei 17-chetosteroidi e dei corticoidi totali urinari in soggetti sottoposti a trauma ipertermico. — Bolletino della Società italiana di biologia sperimentale (Napoli), 29 (8): 1554-1556. July-Aug. 1953. In Italian. DNLM

Urinary levels of 17-ketosteroids in 8 subjects exposed to heat (43°-45°C.) were determined at 24 and 48 hours following exposure and found to be not significantly altered. Under the same conditions, 5 subjects exhibited an increased level of total urinary corticoids. This increase occurred 24 hours after exposure and the levels returned to normal shortly thereafter.

2570
[Carpentier, R.,
W. S. Potocki, N. Duke, and A. S. Crossfield]
PILOT PROBLEMS IN TRANSONIC

FLIGHT: EXCERPTS FROM DISCUSSION BY RESEARCH PILOTS AT AGARD GENERAL ASSEMBLY. — Aeronaut. Engin. Rev., 13 (9): 44-49, 87. Sept. 1954.
DLC(TL501.A326, v. 13)

The physiological and psychological problems presented by transonic flight do not differ excessively from those presented by the characteristics of modern aircraft at extremely high speed at high altitudes. Some difficulties arise from unsolved stability, control, and aerodynamic problems, or the extension of subsonic flight to transonic or to supersonic regions. The development of pilot fatigue seems to be closely connected with boredom which emerges as the pilot is relieved from most of the flight operations by automatic controls. Among the more serious medical problems are deafness, which seems to be a chronic disease of pilots, and sinus blockage under extreme pressure changes. These two factors limit severely a pilot's flying time and lead to psychological problems which in turn reflect in performance.

2571
Carpousis, A.
AVIATION AND TEETH WITH SPECIAL REFERENCE TO AERODONTALGIA. – Jour. Aviation Med., 25 (6): 675-679. 1954.
DLC (TL555.A1A4, v. 25)

The pathology of aerodontalgia aggravated by high-altitude flying is discussed; this condition seems to show a positive correlation with dental caries. The pain arises from a composite of the caries and pressure due to the expansion of gases within the structure of the tooth which occurs at low atmospheric pressure. Decay in the carious area results in formation of carbon dioxide, ammonia, hydrogen sulfide, and nitrogen. It is the expansion of these gases, especially the nitrogen, taking place within the unyielding structure of the tooth which causes the toothache. Some of the environmental stresses to which teeth are subjected at altitude are: repeated anemia due to positive g forces causing the blood to drain from the dental pulp; mechanical pressure of nitrogen bubbles liberated may lead to degeneration of pulp; lowered barometric pressure, low oxygen saturation, high-velocity cold air passing over the enamel; high frequency vibrations, trituration due to fear and cold, and cold oxygen. Various conditions included under aerodontalgia are: throbbing pain, sharp intermittent pain, reflex disturbances referred to the teeth, reflex neuroses. The author stresses the importance of frequent dental examinations and X-rays of the maxillomandibular areas as a means of prophylaxis, control, and treatment.

2572
Carr, W. J.
THE EFFECT OF COLOR, SHAPE, AND LETTER CODING UPON CONTROL CONFUSIONS. — (Thesis, Univ. of Pittsburgh, Pennsylvania). 63 p. Ann Arbor: University Microfilms, 1954.
DLC (Microfilm AC-1, no. 9962)

Three methods of reducing control confusion have been proposed: (1) standardization of control position, (2) proper placement of controls, and (3) coding of controls. It is the purpose of this experiment to test the hypothesis that coding of controls will reduce the frequency of control confusion. Different kinds of coding (color, shape, and letter) were compared with a no-coding situation. A total of 96 subjects of both sexes participated in the experiment. The following variables were tested: (1) number of trials required to learn the tasks; (2) number of trials required to relearn the tasks; (3) amount of interference caused by the alteration of the relative positions of controls; and (4) the sum of the number of trials required to learn and relearn the task. The results show that none of the codings investigated affected the speed of learning, relearning, or interference caused by the alteration of relative positions of controls. No differences with respect to sex were observed.

2573
Carter, E. T.
REGULATION OF RESPIRATION DURING CARBONIC ANHYDRASE INHIBITION. — Federation Proceedings, 11 (1^{1}): 23. 1954.
DLC (QH301.F37, v. 13)

Eight dogs were given Diamox, a carbonic anhydrase inhibitor, intravenously. The following observations were made: 1) fall in urine [H+], 2) decrease in plasma CO_2 content, 3) rise in arterial [H+], 4) decrease in CO_2 elimination, 5) decrease in R.Q., 6) increase in ventilation and 7) no significant change in arterial P_{CO_2} as measured by the "direct-bubble" method of Riley, Proemmel, and Franke in spite of a significant decrease in alveolar P_{CO_2}. Statistical analysis of these shifts indicates significant multiple regression between ventilation and the 2 variables, alveolar P_{CO_2} and arterial [H+] . Also, the inverse relationship between ventilation and alveolar P_{CO_2} showed significant correlation. However, the "direct-bubble" arterial P_{CO_2} correlated neither with the ventilation nor with the alveolar P_{CO_2} These analyses indicate that there is no alveolar-pulmonary end capillary P_{CO_2} gradient with respect to the plasma. Further, there seems to be a considerable erythrocyte-to-plasma P_{CO_2} gradient which is lost during the time required for in vitro analysis. The alveolar P_{CO_2} ventilation relationships imply that during the lung-to-brain circulation time, relatively little change in plasma P_{CO_2} occurs. Graphic analysis of ventilation-alveolar P_{CO_2}-arterial [H+] interrelationships suggests that Diamox-induced acidemia is primarily metabolic in nature. (From the author's abstract)

2574
Casiello, G. 1953
[BRIEF CONSIDERATIONS ON THE CAUSES OF STUDENT PILOT DISCHARGE IN A FIRST PERIOD SCHOOL] Brevi considerazioni sulle cause di esonero di allievi piloti in una scuola di primo periodo. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 68-73. In Italian, with English summary (p. 73).
DNLM (W3.C0943a)

The following causes for discharge in a group of 800 student pilots were recorded: (1) resignations; (2) insufficient aptitudes, and (3) physical defects. The need for more exact selection methods, in addition to psycho-physiological controls, including aptitude tests, are discussed.

2575
Casiello, G., 1953
and A. Latessa
[ON A CASE OF OTITIC BAROTRAUMA] Su di un caso di otite da barotrauma. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 74-77. In Italian, with Engligh summary (p. 77)
DNLM (W3.C0943a)

A case is reported of otitic barotrauma in a pilot with chronic pharyngitis and probable stenosis of the eustachian tube. The diagnostic and therapeutic aspects are also discussed.

2576
Cassen, B.,
H. Gass, and K. Kistler
COMPARATIVE EFFECTS OF HIGH EXPLOSIVE BLAST ON MECHANICALLY CONSTRAINED MICE AND RATS. — Jour. Aviation Med., 25 (2): 123-127. April 1954.
DLC (TL555.A1A4, v. 25)

Field tests were conducted in which immobilized rats and mice were subjected simultaneously to dorsally incident air blast. One rat and one mouse were mounted alongside each other on a rectangular piece of 1/4-inch-thick steel plate. These plates were then suspended approximately 10 feet above the ground at distances ranging from 11 to 18 feet from a 10-pound charge of Composition C moldable explosive,

corresponding to expected free space-shock pressures of 30-10 pounds per square inch. After the blast, the wet lung weights were determined. It was observed that although the wet lung weights of the rats and mice differed by a factor of about 10, the relative degree of pulmonary edema produced in them at the same distance from the blast was the same. The pressure range causing death was also the same for the two types of animals.

2577
Cavalieri, V. 1953
[STUDY ON POSSIBLE OCCUPATIONAL IMPAIRMENT IN FLIGHT PERSONNEL APPEARING WITH AGE] Uno studio su una eventuale usura professionale del personale aeronavigante rivelantesi con l'età. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 78-85. In Italian, with English summary (p. 84).
DNLM (W3.C0943a)

Ten former pilots from 55-65 years of age were given various physiological tests in order to establish a possible relation between their age and any occupational impairment. Since no body impairment greater than the normal was found it is suggested that this phenomenon may support the theory that a dynamic personality, such as a pilot, represents an anti-aging factor which compensates the negative effect of occupational impairment.

2578
Cerulli, F. 1952
A SPECIFIC TREATMENT FOR NEUROVEGETATIVE DYSTONIA. — Amer. Jour. Psychiat., 108 (10): 779-784. April 1952.
DLC (RC321.A52, v. 108)

An evaluation was made of 32 World War II veterans presenting a variety of functional somatic symptoms to gain suggestions for finer screening methods at the induction. The patients were treated concomitantly by psychotherapy and a combination drug therapy aimed at relaxing the sympathetic, parasympathetic and cerebral dysfunction. Premilitary, military, civilian, and treatment phases were analyzed in each case to determine dynamics leading to the symptom complex. Three case histories are presented, including that of a veteran who had fear of flying and had resigned from air corps duty. A careful screening of all individuals from unstable backgrounds is suggested as a method for reduction of acute military reactions, as these individuals have a tendency towards overemphasis of the drive for self-preservation.

2579
Chapanis, A., 1953
and R. A. McCleary
INTERPOSITION AS A CUE FOR THE PERCEPTION OF RELATIVE DISTANCE. — Jour. Gen. Psychol., 48 (2): 113-132. April 1953.
DLC (BF1.J64, v. 48)

The hypothesis that cues at the junction-points between two figures are the sole determiners of interposition which becomes a cue for depth discrimination, was tested in two experiments. The results indicate that, in contrast to the hypothesis, the over-all form and relative sizes of the elements, and the completeness of the pattern are more important than the junction-point cues as stimulus characteristics for interposition.

2580
Chapin, J. L.
VENTILATORY RESPONSE TO OXYGEN BREATHING OF INDIVIDUALS ACCLIMATIZED TO ALTITUDE. — Jour. Aviation Med., 25 (5): 500-503. Oct. 1954. DLC (TL555.A1A4, v. 25)

This experiment was conducted to determine whether certain respiratory patterns of patients with chest diseases while breathing oxygen could be duplicated in normal subjects. All experiments were carried out at Denver, Colorado (average barometric pressure, 627 mm. Hg). Nine healthy individuals (residents) were used as

subjects: the respiratory pattern showed a marked depression after the first minute while breathing high-oxygen mixtures; during the next ten minutes, the ventilation gradually returned to normal, and then an overshoot in ventilation occurred for the next five minutes. The author suggests that the initial ventilatory depression is due to elimination of anoxia. During the period of depression, the alveolar pCO_2 becomes elevated; this elevated pCO_2 results in the gradual return to normal ventilation. The overshoot might be due to a sudden release of any CO_2 which was dammed back during the recovery to normal ventilation. The author concludes that anoxia and CO_2 tension are both causative factors for normal respiration and that they act together.

2581
Chase, H. B.
CUTANEOUS EFFECTS OF PRIMARY COSMIC RADIATION. – Jour. Aviation Med., 25 (4): 388-391, 427. Aug. 1954. DLC (TL555.A1A4, v. 25)

Two studies were conducted at ground level with irradiations of black mice. X-irradiation in a narrow beam of 1,000 r produced nearly all white hairs in an area of either resting or actively producing follicles. A narrow deuteron beam was 1/10 as effective compared to the X-rays in destroying the pigment cells of a follicle. X-ray dosage of 1,500 r caused temporary epilation of a resting follicle, while 3,000 r caused permanent epilation. In a growing follicle, irradiation by X-rays of 300 r produced temporary epilation and 1,500 r caused permanent loss of hair. 1200 r of X-rays resulted in mild hyperplasia of the epidermis. The deuteron beam at dosages of 12,000 r produced a small hyperplastic area at the site of a follicle 11 days after exposure. A third study was conducted during high-altitude flights at 90,000 feet. Only 8 black mice survived; 3 of the mice showed positive evidence of hits by heavy nuclei. One developed 3 follicles of white hair, possibly from a "star" radiation; another showed a triad of 3 white hairs, and the third grew a row of 12 hairs extending 4 mm. on its left side, which could have resulted from a grazing hit by a heavy nucleus.

2582
Chinn, H. I., 1953
S. W. Handford, Paul K. Smith, T. E. Cone, R. F. Redmond, J. V. Maloney, and C. McC. Smythe
EVALUATION OF SOME DRUGS IN SEASICKNESS. – Jour. Pharmacol. and Exper. Therapeutics, 108 (1): 69-79. May 1953. DLC (RS1.J85, v. 108)

Essentially the same as item no. 236, vol. 1.

2583
Chinn, H. I.,
and R. F. Redmond
EFFECT OF DRUGS ON AIRBORNE PERSONNEL. I. PRIMAQUINE AND HYPOXIA TOLERANCE. – School of Aviation Medicine, Randolph Field, Tex. April 1954. iii+2 p. (Project no. 21-1208-0009, Report no. 1). AD 36 568 PB114196

Fifteen mg. of Primaquine base taken daily by white male subjects resulted in a slight but significant formation of methemoglobin (1.02% of the total hemoglobin) at the end of the 14-day experimental period. However, no impairment in the time of useful consciousness was detected with reduced oxygen mixtures equivalent to 26,000 -30,000 feet. Even less effect would be expected at the altitude normally traversed by transport planes (5000 to 10,000 ft.). Thus, there is no contraindication to the air transport of persons receiving Primaquine. (AD abstract)

2584
Chinn, H. I.,
and R. F. Redmond
EFFECT OF PRIMAQUINE ON HYPOXIA TOLERANCE. – Jour. Applied Physiol., 6 (12): 773-775. June 1954. DLC (QP1.J72, v. 6)

Same as item no. 2583.

2585
Chotiprasit, S.
COLOUR BLINDNESS. — Royal Thai Air Force Med. Gaz. (Bangkok), 3 (6): 546-554. Dec. 1954. In Thai, with English summary (p. 553-554). DNLM

The author investigated color blindness among 1000 adults, most of whom were airmen in the Royal Thai Air Force. For the routine eye examination, American Optical pseudoisochromatic plates were used to test color perception. All examinees were found to have normal vision except for color vision. The 28 female subjects were found to have normal color vision. Thirty-nine of the 972 male subjects (4.01%) were diagnosed as having defective color vision. This incidence corresponds to previous reports of the incidence of defective color vision in males. The plates misread most frequently were #5 and #15. A reexamination of the color blind subjects, using the wool skein classification test, showed that most of them were able to identify the red and green colors correctly, but were unable to classify according to shade. A case of total color blindness was not observed among the subjects of this series. (From the author's summary)

2586
Chow, B. F.,
C. Barrows, and R. Yamamoto
PROTEIN METABOLISM UNDER STRESSFUL CONDITIONS. — In: Spector, H. and M. S. Peterson, (ed.), Nutrition under climatic stress. . . , p. 91-97; discussion, p. 98-101. Nat. Acad. of Sci. — Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453
PB 117 996

The data described demonstrate that under the stress conditions employed (dietary, heat stress, cold stress, cortisone, and inanition) there were: (a) an increase in the destruction of tissue nitrogen upon raising or lowering of the environmental temperature, (b) changes in concentration of certain enzymes in the liver or of plasma enzymes after injection of cortisone, and (c) a selective decrease in various protein enzymes as a result of inanition. In preliminary studies it was shown that the dietary regimen, in particular, the type of protein ingested, can influence the body composition in terms of minute but physiologically important components, such as enzymes and plasma protein fractions. The classical measurements of the growth rate and nitrogen balance may not reflect adequately the nutritional state in so far as the concentration of different enzymes is concerned. Investigation of the effects of diet on performance showed that the swimming time of animals fed casein or meat diet surpassed that of animals on a wheat gluten diet, even though the carcasses were of approximately the same specific gravity. Swimming time was also decreased in fasting.

2587
Christensen, E. H.
RESPIRATORY CONTROL IN ACUTE AND PROLONGED HYPOXIA. — Proc. Roy. Soc. (London), 143 (910): 8-12. Dec. 1954. DLC (Q41.L7, v. 143)

In acute severe hypoxia, hyperventilation is supposed to be mediated by stimulation of the respiratory center through reflexes by way of the peripheral chemoreceptors. Currently there is some doubt whether C_H or CO_2 can be regarded as normal stimuli for the peripheral chemoreceptors. The threshold for these stimuli seems to be so high that during hypoxic hyperventilation, where the C_H and CO_2 level is below normal, they can hardly be active. Other experiments, too, have indicated that in acute hypoxia CO_2 does not take part in the maintenance of ventilation when pulmonary ventilation is increased. Maintenance of ventilation is effected entirely by hypoxic stimulus acting on the chemoreceptors. In prolonged hypoxia, hyperventilation in an acclimatized human subject is due

partly to hypoxic chemoreceptor stimulus, which can be eliminated by O_2 breathing, and partly to the stimulus of "fixed" hyperventilation, which persists for some time even after return to normal pressure. This "fixed" hyperventilation cannot be explained by reduction in alkali reserve due to acclimatization, but must be attributed to a lowered threshold to CO_2 in the respiratory center.

2588
Christensen, H.
THE CHEMICAL AND NERVOUS CONTROL OF RESPIRATION. — In: (School Aviation Med.), Respiratory physiology in aviation, p. 103-108. Randolph Field, Tex. Sept. 1954. (Project no. 21-2301-0003). AD 49 179 PB 121739

Theories explaining the control of respiration under different circumstances are reviewed. Certain doubts are expressed concerning the validity of the results of various tests as men or anesthetized animals may react differently to certain environmental changes applied during these tests. Opinions differ on the importance of chemoreceptors in the respiratory process. Deliberations on the three most important factors in the physiological process of respiration: chemical stimulus, hypoxia, and muscular work are summarized.

2589
Christensen, J. M.,
and C. W. Crannell
TACHISTOSCOPIC AND PERIMETER TRAINING ON THE VISUAL FORM FIELD. [Abstract] — Amer. Psychologist, 9 (8): 347. Aug. 1954.
DLC (BF1.A55, v. 9)

It was attempted to investigate the hypothesis that general expansion of the visual form field (i.e., peripheral visual acuity) is possible through transfer from tachistoscopic training and training in peripheral viewing of objects. Such training, if successful, would have wide applicability in such diversified tasks as remedial reading, piloting of aircraft, etc. Different groups of subjects (undergraduate students) were given extensive training on tachistoscopes and perimeters. They were then tested for evidences of transfer to various visual tasks of varying similarity to the training task. There was no evidence of transfer to other tasks except when the test task was very similar to the training task. The most reasonable conclusion at present seems to be that the improvements demonstrated in training of this nature are the results of the subjects' capacity for learning to respond to reduced cues. No support was found for a generalized improvement in peripheral visual acuity. It is believed that the discrepancy between these experiments and the findings of other experimenters can be explained in terms of methodological errors, sampling errors, inadequate statistical evaluations, and acceptance of anecdotal material as scientific evidence. (Abstract, modified)

2590
Christy, R. L.
JET ENGINE AND OTHER NOISE PROBLEMS ABOARD AIRCRAFT CARRIERS. — Jour. Aviation Med., 25 (5): 485-491. Oct. 1954.
DLC (TL555.A1A4, v. 25)

Noise problems have arisen aboard carriers with the shift from propeller-driven aircraft to jets. These planes create sounds with intensities varying from 135 to above 150 decibels when the engines are equipped with afterburners. During the era of propeller-equipped craft, the crews handling them in take-offs and landings were protected from extreme noise intensities only by using cotton in the ears or ear plugs. With the advent of jet planes, these methods gave poor protection at the new intensities of sound encountered. As a direct result of this situation, a new type helmet was developed for deck personnel incorporating ear muffs made of a cellular material which, under actual test, proved to be

very efficient in shielding the auditory system against sounds of intensities near 150 decibels. Later models of these helmets will include earphones for receiving radio orders from the air officer in charge of the entire flight deck, inasmuch as his personal location during flight operations is not on the deck, but is located at "primary fly control" some 30 feet above the deck itself. The author also suggests as a preventive measure annual audiograms for all personnel working around jet engines.

2591
Cier, J. F.,
and M. Tanche
[CARDIAC FREQUENCY AND ADRENALIN IN THE NORMAL RAT AND THE RAT IN HYPOTHERMIA] Fréquence cardiaque et adrénaline chez le Rat normal et le Rat en hypothermie. — Journal de physiologie (Paris), 46 (1): 299-300. 1954. In French. DNLM

No change in cardiac frequency was observed when adrenalin and arterenol were administered to anesthetized, hypothermic rats. The experiment was repeated on a heart slightly retarded by moderate centrifugal excitation of a pneumogastric nerve, which was cut at the neck. Under these conditions adrenalin and arterenol increased cardiac frequency. The authors conclude that low body temperatures lower the frequency of excitations and the tonic activity of the nervous system accelerator.

2592
Clark, B.,
and M. A. Nicholson
AVIATOR'S VERTIGO: A CAUSE OF PILOT ERROR IN NAVAL AVIATION STUDENTS. — Jour. Aviation Med., 25 (2): 171-179. April 1954.
DLC (TL555.A1A4, v. 25)

Same as item no. 1238, vol. II.

2593
Clark, R. T.,
H. I. Chinn, J. P. Ellis, N. E. R. Pawel, and D. Criscuolo
TISSUE RESPIRATORY STUDIES DURING ALTITUDE AND COLD EXPOSURE. — Amer. Jour. Physiol., 177 (2): 207-210. May 1954.
DLC (QP1.A5, v. 177)

A slight, but significant, decrease in oxygen uptake was found for liver slices from rats chronically exposed to altitude, using glycerophosphate as a substrate. Under similar experimental conditions, the respiration of liver slices from cold-exposed rats was markedly increased. Cyclophorase activity was lower in liver slices from exercised rats maintained at 18,000 ft. for 35-38 days than from rats exercised at ground level. Cyclophorase activity of liver and kidney was determined in cold-exposed rats, and of the liver, kidney, diaphragm, heart, soleus muscle, gastrocnemius muscle, and brain of altitude-exposed animals. Only the activity of the diaphragm was significantly higher after exposure. (From the authors' summary)

2594
Clegg, W. C.,
and N. M. Dunfield
NON-VISUAL PERCEPTION OF THE POSTURAL VERTICAL. I. SAGITTAL PLANE. — Canad. Jour. Psychol. (Toronto), 8 (1): 1-9. March 1954.
DLC (BF1.C3, v. 8)

Three experiments with a tilting-chair apparatus evaluated the effects of four variables upon the error of perception of the postural upright with visual cues absent. The four variables studied in the sagittal plane were: the degree of initial tilt, the time held at initial tilt, the direction of initial tilt, and the angular velocity of return. From the results of these experiments it may be concluded that: (1) The non-visual perception of the postural upright, when moving toward the vertical from positions of forward or backward tilt in the sagittal plane, is influenced by the magnitude of initial tilt, the speed of return, and the direction of initial tilt. Errors of underestimation of the vertical increase as the magnitude of initial tilt increases, the velocity of return decreases, and the subject is returning from backward rather than forward tilt. (2) Subjects differ sig-

nificantly in their ability to estimate the vertical. And (3) the length of time in a tilted position preceding righting has no significant effect upon the magnitude and direction of error. (Authors' summary)

2595
Clegg, W. C.,
and N. M. Dunfield
NON-VISUAL PERCEPTION OF THE POSTURAL VERTICAL. II. LATERAL PLANE. — Canad. Jour. Psychol. (Toronto), 8 (2): 80-86. June 1954. DLC (BF1.C3, v. 8)

The procedure was identical with that outlined under item no. 2594, with the exception that the variables were studied in the lateral plane. The findings were basically the same, with the following variations: (1) Vertical perception errors increased when the subject was returning from right rather than from left; and (2) females made significantly smaller errors than males. (Author's summary, modified)

2596
Clegg, W. C.
NON-VISUAL PERCEPTION OF THE POSTURAL VERTICAL. III. DIAGONAL PLANES. — Canad. Jour. Psychol. (Toronto), 8 (4): 209-213. Dec. 1954. DLC (BF1.C3, v. 8)

Under the conditions outlined under items no. 2594 and 2595, the following results were obtained: In the left diagonal plane, subjects returning from positions of right-backward tilt make significantly larger errors than from left-forward tilt, while the direction of tilt in the right diagonal plane does not affect perception errors.

2597
Clemedson, C. J.
CORRELATION BETWEEN RESPIRATORY PHASE AND EXTENT OF LUNG DAMAGE IN AIR BLAST INJURY. — Jour. Applied Physiol., 7 (1): 38-42. July 1954. DLC (QP1.J72, v. 7)

In rabbits exposed to high explosive shock waves in a detonation chamber, no correlation could be found between the respiratory phase, i.e. the quantity of air in the lungs and the extent of lung injury. Exposure to a shock wave of long duration causes an expulsion of air from the lungs, that is greatest if the lungs are filled, when the animal is struck by the shock wave but is seen even if the lungs are in maximal expiration. A shock wave of very short duration causes only a slight or no expulsion of air. These findings are discussed as are the differences in the development of the lung injuries in air blast injury and in explosive decompression. (Author's summary)

2598
Clemedson, C. J.,
H. I. Hultman, L. Lundberg, and B. Lundell
REFLECTION OF A HIGH EXPLOSIVE SHOCK WAVE AGAINST A LIVING BODY. — Jour. Aviation Med., 25 (3): 289-294. June 1954. DLC (TL555.A1A4, v. 25)

The reflection of a high explosive shock wave against the body of a living rabbit has been studied with the aid of a schlieren photography technique. Irregularities of the body surface will cause disturbances in the reflected wave. No partial or intensified reflections are, however, caused by interior bone structures such as the ribs. Photographs taken on the side of the animal turned away from the charge failed to reveal any shock wave transmission through the body. (Authors' summary)

2599
Cochran, L. B.
A STUDY OF THE HALF-PRESSURE ANTI-BLACKOUT SUIT. — Naval School of Aviation Medicine, Pensacola, Fla. July 20, 1954. 1+4+6 p. (Project Report no. NM 001 059.15.03). AD 44 403 UNCLASSIFIED

A half-pressure antiblackout suit was designed to provide evenly distributed pressure over the total body area from the waist downward. Tests conducted on the human centrifuge indicated significantly greater protection of vision by the half-pressure antiblackout suit than is afforded by service

antiblackout suits; the suit was also considered more comfortable than the service antiblackout suit in spite of frequent complaints by the subjects. The laboratory tests revealed certain unexplainable pulse-rate response and irregularity of cardiac rhythm induced by pressurization which made it inadvisable to determine the absolute protection afforded by the suit. The suit gave promise of being easily incorporated into a combination exposure and anti-g suit. (AD abstract)

2600
Cochran, L. B.,
P. W. Gard, and M. E. Norsworthy
VARIATIONS IN HUMAN G TOLERANCE TO POSITIVE ACCELERATION. — Naval School of Aviation Medicine, Pensacola, Fla. Aug. 31, 1954. 13+4 p. (Project Report no. NM 001 059.02.10). AD 50 297 UNCLASSIFIED

One thousand subjects were tested on the human centrifuge, composed of the following groups: (1) master control, (2) naval aviators, (3) referral groups, (4) naval aviation cadets, and (5) miscellaneous. The differences in mean g tolerance for all groups tested for loss of peripheral vision, blackout, and unconsciousness were not significant. Also, a great range in human g tolerances for these symptoms was determined, each having approximately the same variations. It was found that neither the time required to attain "peak g" nor the g level had any significant effect on the time required to produce loss of peripheral vision, blackout, and unconsciousness in individuals experiencing these symptoms at various g stresses. A comparative study may be done to ascertain the effects of varying rates of onset and varying magnitudes of g stress loads on the time required to produce loss of vision and consciousness. On the basis of these findings plus the frequency of blackout and unconscious episodes as reported by flight students and instructors in the Naval Air Basic Training Program, it is suggested that an evaluation should be made of the desirability of providing antiblackout suits in Basic Training. (From the authors' summary)

2601
Coe, L. A.
SOME NOTES ON THE REACTIONS OF AIRCRAFT PILOTS TO ZERO GRAVITY. — Jour. Brit. Interplanetary Soc. (London), 13 (4): 244. July 1954. DLC (TL790.A1B7, v. 13)

Twenty subjects, all qualified pilots, were subjected to near-zero gravity for periods up to 20 seconds by maneuvering a Meteor Mark 7 jet trainer. The following reactions were observed: an immediate feeling of insecurity resulting in a reflex action which caused the subject to clutch at something, usually the seat or the sides of the cockpit; this was followed by a sense of relief and relaxation; simple mechanical actions could be performed, depending greatly on the experience and the trust of the subject in the pilot of the aircraft; simple mental arithmetic could be done, with great variation and no obvious pattern; loose floating articles tended to distract the subject; most subjects allowed their arms to float up in front of them unless they were required to do something; no subject felt distress or nausea, most of them enjoyed the experience; dust normally present in the aircraft's atmosphere was soon felt as a considerable nuisance.

2602
Cohn, J. E.,
D. G. Carroll, B. W. Armstrong, R. H. Shepard, and R. L. Riley
MAXIMAL DIFFUSING CAPACITY OF THE LUNG IN NORMAL MALE SUBJECTS OF DIFFERENT AGES. — Jour. Applied Physiol., 6(10):588-597. April 1954. DLC (QP1.J72, v. 6)

The maximal diffusing capacity of the lung for oxygen was determined in 21 normal subjects ranging in age from 17 to 76 years. There is a significant decrease in maximal diffusing capacity with age, the relationship being described by the regression equation DO_2

= 0.67 height — 0.55 age — 40.9. The findings are of interest in relation to the nature of the aging process. It is not unlikely that the changes in the capillary bed of the lung in relation to age are similar to those occurring in other organs. The data presented and the regression equation derived therefrom provide normal standards with which to compare findings in patients with pulmonary disease. (Authors' summary)

2603
Cole, E. L.
J. L. Milton, and B. B. McIntosh
ROUTINE MANEUVERS UNDER DAY AND NIGHT CONDITIONS, USING AN EXPERIMENTAL PANEL ARRANGEMENT: THE NINTH OF A SERIES OF REPORTS ON EYE FIXATIONS OF AIRCRAFT PILOTS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-220, March 1954. vii+51 p. (RDO no. 694-31). AD 35 161 UNCLASSIFIED

The frequency, duration and sequence of eye fixations made by 15 pilots when flying day straight and level, level turns, climbing turns, straight dives and during night straight and level and level turns with a new panel arrangement are summarized. Comparisons are made between the maneuvers flown under day and night conditions. Also, for comparison of standard and experimental panel arrangements, data previously obtained using the standard Air Force panel during routine maneuvers under day conditions are included. Under all conditions the directional gyro, gyro horizon, vertical speed, airspeed and altimeter are the most used instruments. Significantly more and shorter fixations were made during day level turns than for night level turns. Significantly longer fixations were made on the instruments during night straight and level flight than for day straight and level flight. The total number and average length of fixations during straight and level, level turns and 180 degree time turns were significantly more and shorter on the experimental panel than the standard panel during these maneuvers. Results indicate that the optimal spacing between instruments is short and horizontal; instruments in the top row tend to be fixated first and more frequently; the standard panel represents a better instrument panel arrangement for routine maneuvers. (From the authors' abstract)

2604
Colin
[PRESSURE BREATHING] La réspiration en supression. — Médecine aéronautique (Paris), 9 (3): 319-323. 1954. In French. DLC (TL555.M394, v. 9)

This is a brief review of the indications of oxygen breathing under pressure and its effects on respiration, blood gases, circulation and comfort. A table is presented showing the relations between oxygen pressure, alveolar oxygen tension, and altitude from sea level to 15,400 m. [50,500 feet.] Descriptions of an American (A-13A) and a French oxygen mask (type Ulmer) are given.

2605
Comfort, E. 1953
AIRCREW EMERGENCY PRESSURE CELL. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Note WCRD 53-141, Dec. 1953. 8p. (RDO no. 696-79). AD-24 068 UNCLASSIFIED

Experimental long-term protection against incapacitating effects of decompression sickness has been developed in the form of a pressurized one-man capsule consisting of vinyl coated nylon covered by an outer shell of inelastic uncoated nylon. The equipment described in this report represents a functional laboratory model capable of effectively lowering the altitude around an occupant of a depressurized aircraft from 50,000 to 24,000 feet, or from 65,000 to 28,000 feet. It has the additional characteristics of being lightweight, stowable and of minimal size. (Author's abstract)

2606
Comstock, C. C.,
L. Lawson, E. A. Greene, and F. W. Oberst
INHALATION TOXICITY OF HYDRAZINE VAPOR. — Army Chemical Center. Chemical Corps Medical Labs., Md. Research Report no. 253, March 1954. iii+29 p. AD 29 822
UNCLASSIFIED

The toxic signs, mortality rate, and pathological changes produced by inhaling hydrazine (N_2H_4) vapor were determined for acute, subacute, and chronic exposures of different animal species. A few immediate deaths occurred among rats exposed to high concentrations (20,000 mg./cu.m.) of N_2H_4 for periods varying from 0.5 to 4 hours; as many as 5 out of 6 rats died during a 14-day postexposure period. Rats and mice were exposed to daily concentrations of 295, 70, or 26 mg./cu.m. six hours a day, 5 days a week, for up to 6 weeks. At the 295-mg. level, 16 out of 20 rats died after 5 exposures. At the 70-mg. level, more than half of the rats and mice died after 13 exposures. Eleven out of 13 rats and 7 out of 10 mice were dead at the end of the 6-week exposure period at the 26-mg. level. Repeated N_2H_4 exposure caused lung damage, loss of appetite and weight, and vomiting. Convulsions and death occurred after long exposures to moderately high concentrations of N_2H_4. The results indicated that repeated exposures to N_2H4 vapor could be hazardous to man, but a level of 6 mg./cu.m. may be tolerated repeatedly by man for short periods without undue effects. Anorexia and weight loss may constitute a warning sign of impending health hazards. (AD abstract)

2607
Conn, H. O.
SICKLE-CELL TRAIT AND SPLENIC INFARCTION ASSOCIATED WITH HIGH-ALTITUDE FLYING. — New England Jour. Med., 251 (11): 417-420. Sept. 9, 1954. DLC (R11.B7, v. 251)

Two more cases of splenic infarction in Negroes with the sickle-cell trait, precipitated by high-altitude flying, are presented. The literature on this syndrome is reviewed, and a well defined symptom complex is recognized. The treatment of these cases is considered to be conservative medical management, with splenectomy only upon the development of complications. A general program for prevention in the armed forces is proposed. (Author's summary)

2608
Connolly, K. T.
REPORT ON PREPRODUCTION SAMPLES OF DARK ADAPTATION GLASSES. — Pioneer Scientific Corp., Great Neck, N. Y. (Contract N383s-2081A); issued by Naval Medical Research Lab., New London, Conn. Memorandum Report no. 54-10, July 20, 1954. 4+1 p. (Project Report no. NM 002 014.08.07). AD 41 485 PB115294

This report is concerned with the testing of pre-production models of dark adaptation glasses for the use of naval flight personnel. Five pairs of glasses were submitted for testing by the Pioneer Scientific Corporation. The glasses met the required specifications. Although the glasses failed to meet the spectral transmittance of the contract, the transmittance met the rod-cone ratio criteria according to the method recommended by D. Farnsworth and B. Hillman (cf. item no. 1387, Vol. II). Based on these results, the laboratory recommended that the spectral transmittance of the glasses be accepted as satisfactory.

2609
Connolly, K. T.
REPORT ON PRE-PRODUCTION SAMPLES OF FLYING GOGGLES, TYPE II (AMERICAN OPTICAL COMPANY). — Naval Medical Research Lab., New London, Conn. Memorandum Report no. 54-8, June 11, 1954. 3+1 p. (Project Report no. NM 002 014.08.06). AD 37 161 PB115176

Five goggle sets were evaluated to determine whether they met the requirements of Spec JAN-G-635. The

lenses, frames, cotton webbing, and container were tested. The sample goggle sets met the specifications except that the cotton webbing was not flameproof. (AD abstract)

2610

Cook, L.,
and J. J. Toner
THE ANTIEMETIC ACTION OF CHLORPROMAZINE, SKF NO. 2601-A (RP-4560). [Abstract] — Jour. Pharmacol. and Exper. Therapeutics, 110 (1): 12. Jan. 1954.
DLC (RS1.J85, v. 110)

Chlorpromazine, (2-chloro-10-(3 - dimethylaminopropyl) phenothiazine hydrochloride), SKF No. 2601-A (RP-4560), effectively antagonized apomorphine-induced vomiting and swing sickness in dogs. Apomorphine was administered subcutaneously in doses of 0.1 mgm./kgm. It was found that 1 and 2 mgm./kgm. of SKF No. 2601-A (subcutaneously) completely protected 40 and 60% of the group of dogs from vomiting. The frequency of vomiting was inhibited 82 and 92%, respectively. Oral doses of 2, 3.2 or 5 mgm./kgm., completely abolished the emetic response in 10, 50 and 100% of the group and inhibited the frequency of vomiting 40, 90 and 100%, respectively. Benadryl in doses of 20 mgm./kgm. (orally), failed to protect completely any of the dogs, and inhibited the frequency of vomiting by only 11%, which was not statistically significant. The incidence of swing sickness was reduced: 91 to 23% by 3 mgm./kgm. of SKF No. 2601-A (subcutaneously); from 94 to 37% by 5 mgm./kgm. of SKF No. 2601-A (orally); and from 100 to 85% by 10 mgm./kgm. of Benadryl (orally). Hyoscine (0.3 mgm./kgm., orally) failed to decrease the incidence of vomiting. It was found that large doses of SKF No. 2601-A (10 mgm./kgm., subcutaneously), which produced ataxia and depression, slightly raised the threshold of veratrum viride-induced emesis in dogs. Lanatoside C-induced vomiting was not inhibited in any observable manner by SKF No. 2601-A. (Quoted in full)

2611

Cooley, J. C.,
W. L. Peterson, C. E. Engel, and J. P. Jernigan
CLINICAL TRIAD OF MASSIVE SPLENIC INFARCTION, SICKLEMIA TRAIT, AND HIGH ALTITUDE FLYING. — Jour. Amer. Med. Assoc., 154 (2): 111-113. Jan. 9, 1954.
DLC (R15.A48, v. 154)

Six cases of massive splenic infarction in Negro males following high altitude flying are described. Cysteine blood tests for the sickle cell trait yielded positive results in five of the six cases. The concurrence of splenic infarction, high altitude flying, and the sickling trait suggests that a possible hazard exists for the Negro with the sickle cell trait in airplane flights. (cf. item no. 3228)

2612

Cooper, E. R.
FITNESS FOR FLIGHT. — Combat Crew, 5 (3): 25-27. Sept. 1954. DLC

The importance of physical fitness in flying is stressed. Factors such as lack of rest, overeating, and overindulgence in alcohol impair the flying abilities of pilots to a dangerous extent, and contribute to the 70% of all aircraft accidents attributable to pilot error.

2613

Cornia, G., 1953
and G. Ghiringhelli
[RESPIRATORY METABOLISM DURING MUSCULAR EXERCISE IN SUBJECTS OVER 60 YEARS OF AGE] Il metabolismo respiratorio durante l'esercizio muscolare nei soggetti oltre i 60 anni. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 111-114. In Italian, with English summary (p. 113-114).
DNLM (W3.C0943a)

Oxygen consumption was measured using the Knipping method in normal subjects over 60 years of age during muscular exercise on a treadmill ergometer. It was noted that at a certain limit of exercise (400 kilograms per minute) the subjects exhibited an O_2 consumption which increased proportionately with the amount of work. Within this limit the total mechanical work output is constant and greater than that found in younger subjects under the same conditions. (Authors' summary, modified)

2614
Corniglion-Molinier 1952
[THE IDEAL PILOT WOULD BE AN INTELLIGENT ROBOT] Le pilote ideal serait un robot intelligent. — Orion (Paris), 1952 (21 [actually 22]): 41-43. Sept.-Oct. 1952. In French.
DLC (UG635.F807, v. 1952)

The difficulties associated with modern high-speed aircraft, including acceleration pressures and speed, are briefly considered. The problem is emphasized by weighing the need for instrument guidance systems demanded by the increasing complexity of flying against the lack of intelligent judgment of the mechanical device.

2615
Cotes, J. E.
THE EFFECT OF OXYGEN IN REDUCING THE VENTILATION IN NORMAL SUBJECTS WHEN PERFORMING LIGHT EXERCISE [Abstract]. – Jour. Physiol. (London), 125 (2): 66P. Aug. 27, 1954. DLC (QP1.J75, v. 125)

The exercise ventilation has been recorded in normal subjects performing a standardized exercise step test at 200 kg. m./min. for 25 min. The subjects were students and members of the scientific and technical staff of the Medical Research Council Pneumoconiosis Research Unit. The exercise ventilation was recorded each 1/2 min. while the subjects breathed air or oxygen for alternate 5-min. periods. Five min. was allowed for the subjects to reach exercise equilibrium and the ventilation values during the 2nd to 5th min. of the subsequent air and oxygen runs were compared. The mean exercise ventilation in the group of 14 fit undergraduates breathing air and oxygen were 21.10 and 20.13 liters/min. B.T.P.S., respectively. The difference 0.97 ± 0.217 liters was significant at the 1% level. In four older subjects the bigger difference of 2.89 ± 0.486 liters was obtained. (Quoted in full)

2616
Cotes, J. E.
THE OPEN-CIRCUIT OXYGEN EQUIPMENT USED BY THE BRITISH MOUNT EVEREST EXPEDITION [Abstract]. — Jour. Physiol. (London), 123 (3): 24P-25P. March 29, 1954.
DLC (QP1.J75, v. 123)

Oxygen from a high-pressure cylinder is fed at a constant rate through a reducing valve and flow regulator into an 'economizer', whence it is ejected into the oxygen mask during inspiration to enrich the air which the subject breathes. During expiration the oxygen fills up the economizer bag. The opening pressures of the air-mix inspiratory valves on the mask are adjusted to exceed the negative pressure needed to start the discharge of oxygen from the economizer; the oxygen available in the economizer bag at the beginning of each breath is fed into the mask at a constant rate during the early part of the breath and none is expended in enriching the dead space air. The oxygen contained in the expired air is wasted to the atmosphere. The component items of equipment were assembled to form disposable cylinder units each containing 880 liters of oxygen. Up to three units mounted on a lightweight carrying frame supplied low-pressure oxygen to the economizer. The oxygen mask was modified from a standard R. A. F. item by fitting different valves and a protective rubber cowl. It had an acceptable flow resistance for maximal effort and did not freeze up when worn at -25° C. in a 25 m. p. h. wind at ground level for 1 1/2 hr. There were also

soft rubber masks for night use. Oxygen delivery rates of 1-6 liters/min. were provided. The intention was to raise the oxygen tension of the air breathed from that obtaining at 29,000 ft. to that at 17,500 ft., the altitude to which the subject was fully acclimatized. Greater flows, while increasing climbing ability, would have exposed the subject to the danger of losing the benefits of acclimatization. (Abstract quoted in part)

2617
Cotes, J. E.
THE RELATIONSHIP BETWEEN VENTILATION, CO_2 TENSION AND BODY TEMPERATURE IN ONE NORMAL SUBJECT PERFORMING STEADY STATE EXERCISE BREATHING OXYGEN [Abstract]. – Jour. Physiol. (London), 126 (2): 49P-50P. Nov. 29, 1954. DLC (QP1.J75, v. 126)

A blindfolded subject performed a stepping exercise of varying intensity up to an O_2 consumption of 1.3 liters/min., breathing pure O_2 or mixtures of CO_2 in O_2. Rate of breathing, ventilation, and "end tidal" CO_2 tension were recorded continuously, and the rectal temperature was measured at intervals. Over the body temperature range 36.0-38.5°C., the ventilatory response to CO_2 was 1.4 liters/min./1 mm. change in pCO_2, and the ventilation at a constant pCO_2 was linearly related to body temperature. At a given level of exercise while breathing O_2, the subject's body temperature, ventilation, and end tidal CO_2 tension were ordinarily very constant. The rise in body temperature due to exercise could, however, be prevented by water cooling during exercise. Under these conditions the ventilation minute vol. was less and the CO_2 tension greater than that recorded when the normal rise in temperature had taken place. The exercise ventilation while breathing O_2 under these conditions agreed closely with that found for the corresponding CO_2 tension while breathing a mixture of CO_2 in O_2 at rest with a normal body temperature. It is concluded that for this subject the ventilatory response to moderate steady state exercise breathing O_2 can be explained in terms of the additive effects of CO_2 tension and body temperature. (Quoted in part)

2618
Cotes, J. E.
VENTILATORY CAPACITY AT ALTITUDE AND ITS RELATION TO MASK DESIGN. – Proc. Roy. Soc. (London), 143 (910): 32-39. Dec. 1954. DLC (Q41.L7, v. 143)

Experimental data obtained by breathing controlled gas mixtures at simulated altitudes in a decompression chamber, show that the ventilatory capacity of normal subjects increases on ascent to altitude. The major factor influencing the ventilatory capacity is the reduction in air density. The increase is related to the decrease in lung-gas density and is compatible with the hypothesis that the work of maximum breathing remains constant at altitude. An oxygen mask designed for climbers using their full ventilatory capacity is described and its flow resistance compared with that of a low resistance apparatus for measuring a subject's maximum voluntary ventilation. (Author's summary, modified)

2619
Cottle, W.,
and L. D. Carlson
ADAPTIVE CHANGES IN RATS EXPOSED TO COLD: CALORIC EXCHANGE. – Amer. Jour. Physiol., 178 (2): 305-308. Aug. 1954. DLC (QP1.A5, v. 178)

Rats exposed to cold (5°C.) showed an eventual increase in food consumption to meet the increased caloric output. Calorimetric studies indicate that the energy production of these rats increases considerably. The similarity of the metabolic heat production at 25°C. by cold-adapted and control rats suggests that acclimatization to cold facilitates greater heat production at

the lower temperatures, but results in little change of the basal level.

2620 1952
Coulthard, W. H.
AIRCRAFT INSTRUMENT DESIGN. — viii + 309 p. London: Sir Isaac Pitman and Sons, Ltd., 1952.
DLC (TL589.C68)

A presentation of the physical design principles of all aircraft instruments which provide a visual indication to the aircrew is attempted. Pilot, navigator, flight engineer, and automatic flight instruments are treated. Diagrammatic illustrations are utilized to clarify the test. (34 refs.)

2621
Cournand, A.,
A. Mitchell, and A. P. Fishman
APPLICABILITY OF DIRECT FICK METHOD TO MEASUREMENT OF PULMONARY BLOOD FLOW DURING INDUCED ACUTE HYPOXIA. — Federation Proceedings, 13 (1[I]): 31. 1954.
DLC (QH301.F37,v. 13)

The inapplicability of the Fick equation in the presence of large simultaneous variations of blood flow and A-V blood flow changes has been adduced from recently reported discrepancies between cardiac output measured by direct Fick and dye dilution methods during the early period of induced acute hypoxia in dogs. In a group of human subjects exposed for periods up to 25 min. to inspired oxygen concentrations ranging from 14-11%, it was not possible to demonstrate: (1) any significant difference in lactic acid content of pulmonary and peripheral artery blood; (2) any significant difference in oxygen content of blood drawn from symmetrical arteries, at different rates, and in different amounts over corresponding periods, from 5-20 min. after induction of hypoxia. and (3) any significant variations in A-V blood flow changes computed from fractionated or integrated samples. Furthermore, Vo_2 and R at 5 min. were respectively lower and much higher than during the control period, but had reached the control levels at 15-20 min. under the conditions of these studies. Therefore, measurement of oxygen uptake by conventional methods soon after a change in breathing mixture, does not reflect the Vo_2 across the alveolar-capillary membrane. (From the authors' abstract)

2622 1952
Courtice, F. C.,
and P. I. Korner
THE EFFECT OF ANOXIA ON PULMONARY OEDEMA PRODUCED BY MASSIVE INTRAVENOUS INFUSIONS. — Australian Jour. Exper. Biol. and Med. Sci. (Adelaide), 30 (6): 512-526. Dec. 1952. DLC (QH301.A8, v. 30)

The effect of anoxia on the production of pulmonary edema following intravenous infusions of Ringer-Locke solution has been investigated in unanesthetized rabbits. Breathing 11% oxygen in nitrogen for 5 hours did not produce pulmonary edema. With rabbits breathing gas mixtures containing 11% and 13.5% oxygen in nitrogen about half the amount of Ringer-Locke solution was required to produce a given degree of pulmonary edema, compared to the amount required when the animals were breathing air. The chief circulatory difference observed in rabbits breathing 11% oxygen compared with those breathing air was a reduction in cardiac output with a compensatory vasoconstriction to maintain the systemic blood pressure. The resultant redistribution of blood in anoxia was thought to increase the amount of blood in the venous system, thus causing an increase in the venous pressure. The amount of blood in the pulmonary vascular bed would be increased, so that smaller transfusions were required to raise the pulmonary capillary pressure sufficiently to overcome the osmotic reserve pressure. Once this point was reached, however, further infusions would cause the same degree of pulmonary edema in the normal and anoxic animal. The

effect of anoxia in these experiments can, therefore, be explained by hemodynamic changes without postulating a selective increase on the pulmonary capillary permeability. (Authors' summary)

2623
Covell, W. P.

INJURY TO ANIMALS' EARS BY INTENSE SOUND. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract AF 33(038)-500); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. AF Technical Report no. 6561, Part 3, June 1954. v+19 p. (RDO no. 695-63). AD 43 530
UNCLASSIFIED

This final report is a correlation of the data on exposure of animals to intense sounds with the histologic findings. The changes found in microscopic preparations of cochleas of 174 guinea pigs and 7 dogs were mostly induced by a specially constructed siren although rod and ribbon exposures are included for comparison. The material chiefly covers the higher frequency range of 4 to 40 kilocycles per second with intensities ranging from 115 to 165 decibels (ref. 0.0002 microbar). An additional 50 guinea pigs were studied by electrophysiological methods in order to determine the relationship between injury produced by intense sound and the electrical output of the cochlea. These studies will be reported at a later date and the results summarized at this time regarded as preliminary to further investigations. (Author's abstract)

2624
Craig, F. N.,
H. W. Garren, H. Frankel, and W. V. Blevins

HEAT LOAD AND VOLUNTARY TOLERANCE TIME. — Jour. Applied Physiol. 6 (10): 634-644. April 1954.
DLC (QP1.J72, v. 6)

Six trained and acclimatized men took daily walks on a treadmill under various conditions of clothing, metabolic rate, room temperature, and humidity. Each man walked for as long as he could tolerate the conditions, thus defining a voluntary tolerance time (Th in hr.) for these conditions. Observations on heartrate, sweat production, and body temperature were made during each walk and correlated with the tolerance time. Under these conditions and others taken from the literature that included very high environmental temperatures, the best correlative of tolerance time was the heat load (Sa in Cal./m^2). It was concluded that each man would tolerate a characteristic heat load that was independent of the rate of heat storage (S in Cal./m^2/hr.); or Sa = S x Th, where Sa had a standard deviation of about 12 and a mean value for each man of from 36-63. In the high temperature series, the range was from 58-114. (Authors' summary)

2625
Cranmore, D.

LETHAL LEVELS AND GROSS PATHOLOGY OF RATS EXPOSED TO POSITIVE AND NEGATIVE FORCES OF ACCELERATION. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5410, July 30, 1954. iv+37 p. (Project Report no. NM 001 060.11.02). AD 39 424 UNCLASSIFIED

In a study of the lethal levels of stress acceleration, 269 male albino rats were subjected to various combinations of magnitude and duration of positive or negative g stress. The weights of the rats ranged from 169 to 336 g. Centrifuges with arms 3 and 8 ft. in radius were used. Data on the mortality and gross pathology of the animals are presented. Strength-duration curves and mathematical formulae are included. The minimum survival time (100% survival) was attained at 35 positive g, and the infinite survival (the force at which the time factor ceases to be significant in the response) was at 12 positive g.

The spread of these values was sharply decreased for negative g; the minimum survival time was reached at about 15 negative g while the stress tolerated for an infinite was about 3 negative g. Anoxic anoxia was postulated as the immediate cause of death due to acceleration stress. (AD abstract)

2626
Cranston, W. I.,
M. C. Pepper, and D. N. Ross
BLOOD REACTION DURING HYPOTHERMIA [Abstract]. – Jour. Physiol. (London), 125 (1): 20P-21P. July 28, 1954. DLC (QP1.J75, v. 125)

Twenty-one dogs, premedicated with morphine and atropine and anesthetized with thiopentone, were subjected to hypothermia below 27°C. body temperature by passing blood from the femoral artery through a cooling coil to the femoral vein. Arterial blood pH fell during cooling, down to 25°C, and there was an inverse linear relationship between hydrion concentration and body temperature. Below 25°C. the hydrion concentration rose rapidly. There was a linear increase of plasma H_2CO_3 concentration with hydrion concentration and an inverse linear relationship between H_2CO_3 concentration and body temperature down to 25°C. There was no significant change in the plasma bicarbonate level. The increase in respiratory minute volume on inhaling 6% CO_2 (through endotracheal tubes) was similar at 25°C. and 38°C., indicating that at lower temperatures the respiratory center did not become insensitive to CO_2.

2627
Creelman, J. A.
AN ANALYSIS OF THE PHYSICAL FITNESS INDEX IN RELATION TO TRAINING CRITERIA IN NAVAL AIR TRAINING. – Naval School of Aviation Medicine, Pensacola, Fla. Sept. 29, 1954. i+7 p. (Project Report no. NM 001 057.01.01). AD 51 809
UNCLASSIFIED

The central problem of this investigation was to determine the relationships obtaining between objective indices of physical fitness and training criteria. The relationships between these indices and selector variables were also examined. It was concluded that success in pilot training is not related to scores on the physical fitness measures examined. (Author's abstract)

2628
Crema, A.
[ON THE ACETYLATION OF SULFONAMIDES IN HYPOXIA] Sulla acetilazione dei sulfonamidici in ipossia. – Rivista di medicina aeronautica (Roma), 17 (4): 403-407. Oct.-Dec. 1954. In Italian, with English summary (p. 407).
DLC (TL555.A1R5, v. 17)

It is demonstrated that the increased toxicity of the sulfonamides in hypoxia cannot be attributed to a change in the acetylation process. The acetylation of sulfamidopyridine subcutaneously injected into several guinea pigs did not change following a hypoxic condition resulting from an exposure to an altitude of 7500 meters for ten hours.

2629
Criscuolo, D.,
R. T. Clark, and R. B. Mefferd
CELLULAR ADAPTATION DURING EXPOSURE TO HYPOXIA. – School of Aviation Medicine, Randolph Field, Tex.; and Southwest Foundation for Research and Education, San Antonio, Tex. Feb. 1954. 14 p. (Project no. 21-1201-0013, Report no. 5). AD 31 139
UNCLASSIFIED

Two groups of rats fed a low-iron and a high-iron dietary supplement were exposed to a simulated altitude of 20,000 feet for 6 weeks, as were ground-level controls. No significant difference was noted between the survival rates of the low-iron and the high-iron groups either at altitude or at ground level. The hemoglobin increase, which was noted in the high-iron animals but not in the low-iron animals,

was not indispensable for survival. A significant difference was noted in the body weight changes, hemoglobin concentration, hematocrit, and erythrocyte count of the altitude and the ground-level groups. Animals exposed to altitude showed an increased myoglobin content in various tissues and an increased oxygen utilization, as indicated by succinic dehydrogenase activity. No effect appeared to result from the iron as such, but rats on low-iron diets at high altitude showed significant effects as compared to the effects from altitude alone.

2630
Crook, M. N.,
J. A. Hanson, and A. Weisz
LEGIBILITY OF TYPE AS DETERMINED BY THE COMBINED EFFECT OF TYPOGRAPHICAL VARIABLES AND REFLECTANCE OF BACKGROUND. — Tufts Coll. Inst. for Applied Experimental Psychology, Medford, Mass. (Contracts W33-038-ac-14559 and AF 33(616)-2018); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-441, March 1954. iv+24 p. (RDO no. 694-51). AD 43 309
PB119251

The legibility of capital letters as a function of size, stroke width, spacing, and reflectance of background was measured under 0.082 foot-candles of red illumination, using specially designed experimental type. Scores were in terms of speed and accuracy on an oral reading task. No advantage was found for letter spacing above about 50% of mean letter width. Optimum stroke width was in the range of 22% to 25% of mean letter width, shifting toward the higher figure and becoming more sharply defined as reflectance of background decreased. Legibility improved with size over the range investigated (from about 4- to 8-1/2-point), but less rapidly as the upper end of the range was approached and as other conditions became more favorable. With letters at least 0.064 in. high (a typical 6-point) in optimum stroke width, a decrease in background reflectance to 50% produces relatively little impairment of legibility. More limited results on lower case type were generally consistent with those on capitals, but differed in detail because of the smaller size of the letters. (Authors' abstract)

2631
Crumley, L. M.,
W. Atkinson, and D. E. Fletcher
THE DEVELOPMENT OF INSPECTION METHODS AND CRITERIA FOR OPTICAL DISTORTION IN COCKPIT ENCLOSURES. II. VALIDATION OF AN INSPECTION TEST FOR WINDSHIELD DISTORTION. — Naval Air Experimental Station. Aeronautical Medical Equipment Lab., Philadelphia, Pa. Report no. TED NAM AE-4405, Part 2, June 25, 1954. 18+3 p. AD 46 503
PB116296

Cross-validation was made of an inspection test (cf. item no. 2544) for detecting aircraft windshield distortion by applying the test to 25 windshields designed for the left side of the F6F aircraft. The 7 judges agreed in relative scoring of the windshields with the inspection test, although not in the over-all level of scoring. Eleven pilots showed relative agreement in scoring the same set of windshields by a modified method of paired comparisons, and the averaged scores on this criterion scale discriminated reliably among the windshields. Reliable discrimination among the windshields was obtained even by one judge alone when using the inspection test. Significant agreement was shown between the individual inspection test scores and the averaged criterion score, which indicated that the inspection test reliably predicted the criterion. (AD abstract)

2632
Crumley, L. M.,
and W. Atkinson
HUMAN ENGINEERING INVESTIGATION OF THE EXTERIOR LIGHTING

OF NAVAL AIRCRAFT. I. A STUDY OF THE EFFECT OF FLASH RATE AND ON/OFF RATIO ON THE DETECTABILITY OF FLASHING LIGHTS. — Naval Air Experimental Station. Aeronautical Medical Equipment Lab., Philadelphia, Pa. Report no. TED NAM EL-52003, part 1, Sept. 23, 1954. 16 p. AD 44 207
UNCLASSIFIED

The effect on detection time of flash rate, on/off ratio and subject differences was investigated in a factorially designed experiment involving five flash rates (40, 60, 80, 100, and 120 flashes per minute), five on/off ratios (1/2, 1/1, 2/1, 3/1, 4/1), fifteen stimulus positions and five subjects. The experiment was conducted in an experimental situation which simulated red and green wing-tip lights as they would appear to a pilot about two miles removed from a plane which was approaching him head-on. Results of an analysis of variance performed on the averages of the fifteen times each flash rate — on/off ratio combination appeared for four subjects (one subject was dropped as atypical), indicated that flash rate was not a factor in the detection time — but that there was significant subject-flash rate interaction, that subject was a significant factor, and that on/off ratio was significant with ratios below 2/1 better than those above 2/1. Recommendations are made for further studies to provide for better evaluation of the relationships, for selection of a flash rate for aircraft wing-tip lights based on factors other than those tested, and for use of on/off ratios below 2/1 if simultaneous flashing of wing-tip lights is used. (Authors' abstract)

2633
Culbert, S. S.
DIRECTIONAL AFTER-EFFECTS FOLLOWING SYSTEMATIC DISTORTION OF THE VISUAL FIELD. — Jour. Psychol., 37 (1): 81-93. Jan. 1954.
DLC (BF1.J67, v. 37)

The purpose of the present study was to investigate certain after-effects of exposure to distorted visual fields, or specifically, to compare the directional after-effects of six geometric transformations of a rectangular grid composed of 10 white vertical lines and 10 white horizontal lines, the grid being the only figure in a black visual field. A total of 8,640 responses was recorded, which was obtained from 36 subjects, each presented with 240 test objects. It was found that the subjects' phenomenal horizontal was influenced in the direction of the coordinates of the distorted system, that the effect was measurable after the visual stimulus field and visual after-effects had disappeared, and that the amount of the effect was a curvilinear function of the amount of distortion. (Author's summary, modified)

2634
Czech, W.
["CIRCULATORY REACTIONS DURING CABLE CAR TRIPS IN THE ALPS"] "Kreislaufreaktionen bei Bergbahnfahrten in den Alpen." — Medizinische Klinik (München), 49 (50): 2001-2002. Dec. 10, 1954. In German.
DNLM

This is a comment on a paper published under the above title by E. Hausund and H. Jungmann (item no. 2896). The author takes the view that results of experiments using artificial climate chambers (not decompression or pressure chambers) are analogous to those obtained under natural environmental conditions. However, both environments are not to be considered identical in their effects on the human organism. In both cases it is the total complex of environmental factors which is reacted to. The author states that he has observed vasomotor and circulatory reactions at altitude differences of 50 meters in the artificial climate chamber. The conflicting results reported by various researchers concerning the appearance of vagotonia during altitude ascent may be explained

by the relatively rapid succession of phases and also by the fact that the "initial state of reactivity" of the individual determines the degree of systematic reaction to sudden environmental changes. This reactivity state is not always evident because of the unreliability of testing methods used, and also because of the possible lack of synchronism between the circulatory response and changes in the sympathetic tone.

2635
Dale, H. C. A.
THE EFFECT ON PERFORMANCE OF VARIATIONS IN CERTAIN SPATIAL AND TEMPORAL PROPERTIES OF A MULTI-DIAL DISPLAY. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report A.P.U. 212/54, 1954. 13 p. TIP U72352 UNCLASSIFIED

An experiment was designed and carried out in order to answer two questions pertinent to the display properties of an apparatus described by A. Carpenter and R. Conrad (Quart. Jour. Exper. Psychol., 5 (2): 87. 1953). They were: (a) Is it more difficult to deal with a number of spatially scattered sources (dials) than with the same units arranged in a compact group? And (b) is it more difficult to deal with a number of units rotating at dissimilar than with the same number of units rotating at similar speeds when spatial arrangement is constant? The results were unambiguous. They showed that (a) the use of a display consisting of a number of scattered units led to performances which were inferior to those obtained with displays consisting of a compact group of units; (b) a display involving a mixture of fast and slow units led to overall performances of the same quality as that obtained with a display consisting of units which rotated at similar speeds (the number of signals presented per minute being the same in each case). No interaction of the two variables was obtained. (Author's summary)

2636
Daley, E. A.
AVIATION MEDICINE PROGRESS IN AUSTRALIA OVER TWENTY-FIVE YEARS. — Jour. Aviation Med., 25 (5): 451-456. Oct. 1954.
DLC (TL555.A1A4, v. 25)

A quarter century of progress in aviation medicine in Australia is discussed. Such pioneers as G. P. Merz, the first flying physician with the Australian Army Air Corps, and Dr. Charles Kellaway, first of Australia's aviation medicine specialists, are remembered. Also mentioned is the flying doctor service, founded by Dr. John Flynn. In the twenties, The Royal Australian Air Force was organized; this resulted in the establishment of a separate medical corps for this force, and progress in the field of aviation medicine was greatly stimulated. During World War II, certain aspects of aviation medicine in Australia received special attention: ophthalmology, psychiatry and psychology, anti-g suits, tropical conditions, high altitude physiology, motion sickness, acoustics, casualty air evacuation, industrial medicine, hospitalization, and rehabilitation. Since World War II, work has proceeded in the field of aviation medicine with the establishment of an aviation medical center for the Royal Australian Navy.

2637
D'Amato, H. E., 1953
and A. H. Hegnauer
BLOOD VOLUME IN THE HYPOTHERMIC DOG. — Amer. Jour. Physiol., 173 (1): 100-102. April 1953.
DLC (QP1.A5, v. 173)

The plasma volume of dogs subjected to immersion hypothermia under pentobarbital anesthesia is diminished by about 12% at 20°. There is under the same conditions no change in erythrocyte volume, nor is there an over-all change in plasma protein concentration. The fate of the lost plasma has not been definitely established. The more probable explanation

is that it has been trapped in minute peripheral vessels from which erythrocytes are excluded. Evidence is presented which makes suspect any prediction of erythrocyte volume change in hypothermia from hematocrit and plasma volume data. (Authors' summary)

2638
Dambly

[TRAINING OF MILITARY STUDENT PILOTS AND ITS POSSIBLE REPERCUSSIONS ON THEIR NEURO-PSYCHIATRIC EQUILIBRIUM] L'entrainement des élèves-pilotes militaires et ses répercussions possibles sur leur équilibre neuro-psychiatrique. — Annales Belges de médecine militaire (Liège), 107 (4-5): 74-82. April-May 1954. In French. DNLM

Student pilots undergoing rigorous training may suffer from fatigue of the nervous type (caused by sensory and motor exhaustion or unbalance), or of the mental type (caused by mental tension). Additional etiological factors include noise, vibrations, acceleration, cold, altitude, and apprehension. In addition, the etiology and pathogenesis of psychoneurosis are discussed, and it is recommended that medico-physiological examinations be adapted for screening subjects susceptible to neuroses, as well as for the periodic screening of personnel in training.

2639
D'Angelo, V., and C. Sandomenico 1953

[A CASE OF DUODENAL ULCER IN A FIGHTER PILOT FOLLOWING A FLIGHT INCIDENT] Un caso di ulcera duodenale in pilota da caccia in seguito ad incidente di volo. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 131-139. In Italian with English summary (p. 138).
DNLM (W3.C0943a)

A report is presented of a case of duodenal ulcer developing in a fighter pilot following a landing accident. Previous gastric manifestations and the mental behavior of the subject during flight are discussed. The roll of emotional shock due to the flight incident in the etio-pathogenesis of the ulcer is evaluated. In addition, the difficulties encountered by flight surgeons in handling the ailments of fighter pilots are noted.

2640
Daniels, F.

PHYSIOLOGICAL RESPONSES OF MEN TO HEAT AND COLD. — In: Spector, H. and M. S. Peterson, (ed.), Nutrition under climatic stress..., p. 18-32. Nat. Acad. of Sci. — Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954.
AD 67 453 PB 117996

An attempt has been made to describe some of the wide variety of reactions which occur in the human organism during exposure to hot and cold environments with some comments on the acclimatization changes which occur in these responses. It is evident that considerable difference in emphasis is observed between the studies on man and the studies on small animals. Concerning the adaptations to both extremes of temperature in man the emphasis is on the adjustments and adaptations of the cardiovascular system with associated changes in blood distribution, in volume of the body water compartments, in the conduction and blood stream transfer of heat from the interior of the body to the surface, as well as the familiar mechanisms of sweating and shivering. There has been little evidence in man for significant alterations in responses of the endocrine systems. This may reflect the differences in the severity of experimental conditions in animal and human experiments, and as a result different levels of response have been reached. (Author's summary, modified)

2641

Danneskiold, R. D.,
and W. Johnson

AN EVALUATION OF AN EXPERIMENTAL FLIGHT GRADING METHOD FOR USE IN THE NAVAL AIR BASIC TRAINING COMMAND. — Psychological Corp., New York (Contract Nonr-1162(00)); and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 058.24.03). Joint Project Report, Aug. 23. 1954. vi+14p. AD 39 380 PB117838

The experimental grading forms record performance in terms of exactly what a student did during a flight. In Navy ATJ grading forms, performance is rated in terms of judgments of quality of over-all performance made in terms of a hypothetical average performance. Both types of grading forms were evaluated by utilizing experienced aviators undergoing instructor training as students, and highly experienced instructors. The major conclusions of the study indicate that grading of the experimental type is equally as reliable and valid as the Navy ATJ grading forms, in terms of consistency and ability to predict future performance. The experimental forms offered far less opportunities for distortion of grades through "halo" effects based on unrelated personality characteristics and knowledge of past performance, and they were also superior to the currently used Navy ATJ methods for predictions of short-range future performance. The grades on flight proficiencies were somewhat improved by the addition of a subjective judgment of such attributes as headwork, mental attitude, reaction toward flight and air discipline. Instructor attitudes toward in-flight grading were improved through continued use resulting in better familiarization with the technique required.

2642 1953

[Davidson, W. Z.]

THE EFFECTS OF TWO TYPES OF STRESS AND ANXIETY ON PERFORMANCE OF A PERCEPTUAL TASK. — Univ. of Maryland, College Park. Technical Report no. 19 on Indicators of behavior decrement, Aug. 31, 1953. 44 p. (Contract DA-49-007-MD-222). AD 31 284 UNCLASSIFIED

Twenty-seven college students scoring extremely high, and twenty-seven scoring extremely low on a modified form of the Taylor Scale of Manifest Anxiety were selected as subjects to determine the effects of two types of stress and manifest anxiety on performance of a perceptual task. A continuous 70-unit series of five different colors which each subject was to name (red, pink, yellow, and blue) in random order was presented, and the task-induced stress was generated by varying the speed of presentation of colors. Failure stress was induced by verbal instructions, and electric shock was administered to show the subjects what to expect for failure. Immediately after the test trials the subjects were given the Stress Experience Inventory to determine if there was a relationship between subjective feelings of stress and performance and between the stress-inducing condition and subjective feelings of stress. The results indicate that errors of omission are the most sensitive and useful indicators of stress; task-induced stress and, generally, failure stress show a positive correlation with performance as measured by errors of omission; failure stress may dissipate in time; and anxiety increases the susceptibility to the effects of stressful conditions.

2643 1953

Day, R. H.

THE EFFECT ON A DIFFICULT COORDINATION TASK OF THE FREQUENCY OF SIGNALS. — Quart. Jour. Exper. Psychol., 5 (4): 159-165. Nov. 1953. DLC (QP351.E95234, v. 5)

Subjects were required to direct, by moving hand and foot controls, a fugitive spot of light into one of four positions in accordance with changes in the source of signals, and simultaneously, to extin-

guish two lights using a left-hand response. Two groups of subjects have been tested on this complex coordination task. Increasing the frequency of the signals from four successively but irregularly functioning sources was found to increase significantly the "error" scores in controlling the fugitive spot. Variations in signal frequency did not affect the other part of the task requiring left hand responses to a different set of signals. The order of a sequence of 4-signal frequencies over four trials had no effect on the efficiency with which the task was performed. (Author's abstract)

2644
Day, R. H.
THE EFFECT OF SIZE OF TARGET ON ACCURACY OF AIM. — Amer. Jour. Psychol. 67 (4): 659-667. Dec. 1954. DLC (BF1.A5, v. 67)

An experiment has been carried out in which 25 subjects were required to spear with a steel-tipped stylus at a series of targets, consisting of a bull's eye and three concentric rings, in order to test the hypothesis that accuracy of aim is in part a function of target size and to find the limiting values, if any, of such a function. It was shown that accuracy of aim increases using a target of 3 cm. diameter as compared with targets of 1 and 2 cm. diameter, between which there was little difference in accuracy of aim. The trend revealed by 5 sets of 12 shots for the 5 target sizes showed a marked consistency with trend evidenced by the mean error for the 5 sets together. A hypothesis in terms of implicit incentives for the difference in error between targets 2 and 3, and in terms of targets 4 and 5 has been suggested. Helson's concept of "par of excellence" may be a useful and more unifying explanatory principle in the treatment of these data. (Author's summary, modified)

2645 1953
Deane, H. W.,
and C. P. Lyman
COMPARISON OF EFFECT OF COLD ENVIRONMENT ON ADRENAL AND THYROID GLANDS OF A HIBERNATOR (HAMSTER) AND A NON-HIBERNATOR (RAT) [Abstract] — Anat. Record, 115 (2): 389-390. Feb. 1953. DLC (QL801.A45, v. 115)

Hamsters and rats were exposed to 5°C. for 3, 7, 14, or 21 days. The non-hibernators (rats) gained weight, and their adrenal glands increased in weight; the zona fasciculata of adrenal cortex was widened, showing a progressive depletion of lipid in its inner portion; the thyroid showed progressive increase in the height of the follicular cells and a diminution of the colloid. In contrast the hamsters lost weight and their adrenals decreased in weight; the adrenal cortex did not widen, although the glomerulosa became enlarged, and free lipid appeared in the reticularis; the thyroid showed changes similar to the rat's thyroid, but lesser in extent.

2646
Deane, H. W.,
and C. P. Lyman
BODY TEMPERATURE, THYROID AND ADRENAL CORTEX OF HAMSTERS DURING COLD EXPOSURE AND HIBERNATION, WITH COMPARISONS TO RATS. — Endocrinol., 55 (3): 300-315. Sept. 1954. DLC (QP187.A25, v. 55)

Histophysiological responses of the thyroids and adrenals to cold were studied in a hibernator and a non-hibernator, the Syrian hamster and the albino rat respectively, to determine whether involution of thyroids and adrenals is a causative factor in the onset of hibernation. The experimental animals were exposed to cold stress of 5°C., while suitable controls were kept at 23°C. Body temperatures were obtained from both groups. It was found that non-hibernating hamsters, as well as hamsters in a state of hibernation showed no enlargement of the adrenals nor any histophysiological evidence of hyperactivity of either the

zona fasciculata of the adrenal cortex or of the thyroid. In contrast, rats exposed to cold showed histophysiological signs of increased activity of both glands. Also, rats maintained stable body temperatures with or without bedding, whereas hamsters displayed more stable body temperatures when deprived of bedding. The hibernators contrast with non-hibernators in that neither the pituitary-adrenal nor pituitary-thyroid axis seems to be stimulated by moderate cold. The adrenals of hibernators seem to alter principally with respect to sexual activity; further, the adrenals of hibernators are lipid poor It is concluded that polyglandular insensitivity of the endocrines to cold is typical of hibernators but is not a causative factor in the process of entering hibernation. In the hamster, the homeothermic state can be maintained with no involvement of thyroid or adrenal cortex at temperatures which produce hyperactivity of these glands in the rat. This lack of endocrine reaction to cold may be permissive of hibernation, but does not control the onset of the hibernating state. (Authors' summary, modified)

2647 1953

DeBella, G.,
C. Vacca, and B. Mazzega
[ON A POSSIBLE EFFECT OF FOLIC ACID AND SOME PURINE AND PYRIMIDINE BASES ON THE RESISTANCE TO ACUTE HYPOXIA OF THE RAT] Su un eventuale asione dell' acido folico e di alcune basi puriniche e pirmidiniche sulla resistenza all' ipossia acuta del ratto. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 140-144. In Italian, with English summary (p. 143). DNLM (W3C0943a)

One group of sixty-seven day old rats was fed a diet containing folic acid. Another two groups of rats were respectively fed a diet containing folic acid with the addition of thymine, thymidine, adenine, adenosine, cytosine and cytidine. All groups were rendered hypoxic in a decompression chamber at a simulated altitude of 15,000 meters for 30 days or until death occurred. It was observed that neither folic acid nor the other substances had a protective effect on the resistance of growing rats to hypoxia. (From the authors' summary).

2648

De Bois, H. J.
[THE BLOOD PRESSURE IN YOUNG MEN] De bloeddruk bij jonge mannen. — Aeromedica acta (Soesterberg, Netherlands), 3: 281-284. 1954. In Dutch. DNLM

Rejection of aviation candidates solely on the basis of high blood pressure has to be considered carefully and only after repeated examinations, as emotional involvements of the candidate may result in extensive deviations in blood pressure from the established norms. Although attempts have been made to spot potential hypertensives by special procedures, e.g., the cold-pressor reaction, the inability to obtain true rest values detracts from the reliability of such tests. More insight in the course of high blood pressure in young people can be gained by periodic examinations over a number of years, which, in fact, is made possible by the required yearly physical examinations for pilots. The author gives several illustrations where initial high blood pressure in youth receded to normal values during middle age. A 20-year-old applicant was accepted with a blood pressure of 175/70, which a few years later rose to 185/100. However, he continued flying and, when tested after 18 years of flying at the age of 36, was found to have a blood pressure of 130/80. On the other hand, in a 24-year-old pilot with a low blood pressure (90/70), a follow-up examination after a year revealed a blood pressure of 120/80, and has since remained within the normal range. It is hoped that the picture in regard to blood pressure will be clarified and lend itself to more

reliable predictions, as additional data are collected.

2649
DeCoursey, J. D.,
A. P. Webster, and E. R. Babcock
HIGH ALTITUDE OBSERVATION CHAMBER FOR INSECT PHYSIOLOGY STUDIES. — Naval Medical Field Research Lab., Camp Lejeune, N. C. (vol. 3: 73-80). April 1954. (Project Report no. NM 005 052.24.02). AD 38 126
UNCLASSIFIED

An improved high-altitude observation chamber for the observance of gross insect behavior patterns and physiological changes that may occur at varying altitudes is described. The apparatus consists of a plastic box housing five removable Pyrex chambers for the simultaneous study of insects at two different simulated altitudes Each chamber is connected to 1/4-in. copper tubing which passes through a calibrated vacuum gage to the vacuum source. Vacuums of 1 to 30 in. Hg can be maintained. The cooling system is a 1/8-hp. refrigeration unit with evaporation coils within the upper periphery of the plastic box encircling the group of test chambers. Controlled temperatures can be maintained to -5°C. (AD abstract)

2650
Degand, J.
[MEDICAL SELECTION OF NON-FLIGHT SPECIALIST AIR FORCE PERSONNEL: VOLUNTARY CAREER] La sélection médicale du personnel non navigant spécialiste de la Force Aérienne. - V. C. — Annales Belges de médecine militaire (Liège), 107 (4-5): 83-92. April-May 1954. In French.
DNLM

A general outline is presented of the medical examination used in ground crew selection. In addition, the job descriptions and medical selection criteria for the radar operator, controller of air traffic, and controller of operations are discussed.

2651
DeGaugh, R. A.,
and D. M. Knoell
ATTITUDES RELEVANT TO BOMBER CREW PERFORMANCE IN COMBAT. — Air Force Personnel and Training Research Center. Crew Research Lab., Randolph Air Force Base, Tex. Research Bulletin AFPTRC-TR-54-18, May 1954. iv+34 p. (Project no. 7713, Task no. 77220). AD 45 574
PB115211

Attempts were made (1) to develop an attitude scale by means of an iterative scaling technique, (2) to identify the factors common to scale scores, and (3) to estimate the relationships between the attitudes of B-29 bomber crews assigned to combat duty in Korea and their combat performance. Eight reliable attitude scales developed from individual responses by a mean-difference scaling technique were intercorrelated with five significant correlations of the mean crew scores and superiors' ratings of crews (the criterion). A total of 82% of these intercorrelations were significant. Three factors were extracted; their communality with the criterion was 0.27. The factor with the highest correlation was a pride-in-work-group dimension, whereas a moderately high correlation was found between the job-satisfaction factor and the superiors' ratings. No relationship existed between the liking-for-adventure factor and the criterion. (AD abstract)

2652
Dejours, P.
[RECENT ADVANCES CONCERNING ALVEOLAR RESPIRATORY EXCHANGES] Acquisitions récentes sur les échanges respiratoires alvéolaires. — Journal de physiologie (Paris), 46 (2): 679-700. 1954. In French.
DNLM

Equations for alveolar air and alveolar ventilation (O_2 - CO_2 diagram) are reviewed along with the concept of

blood flow relationships and mean alveolar air and ventilation during respiration. Alveolar air during voluntary apnea, voluntary hyper- and hypoventilation, and anesthesia is discussed and respiratory adaptation to altitude is evaluated.

2653
Dejours, P.,
Y. Labrousse, and J. Teychenné
[ACTIVITY OF THE RESPIRATORY CENTERS AND HYPOCAPNIA] Activité des centres respiratoires et hypocapnie. — Journal de physiologie (Paris), 46 (1): 329-334. 1954. In French. DNLM

Sixteen subjects did not present hyperventilation for 1 to 10 minutes (although the CO_2 alveolar pressure was lowered in certain cases as far as 14 mm./Hg). The subjects were exposed to voluntary hyperventilation in ambient air or passive hyperventilation while breathing a mixture of 33% O_2 in N_2 in an iron lung. A study of the relation between total ventilation and alveolar oxygen tension shows that for the values of alveolar oxygen lower than 31 mm./Hg, breathing appears to be independent of alveolar oxygen. The concept extrapolated from the standpoint of apnea and inhibition of respiratory centers proportional to hypocapnia was not experimentally confirmed. (Authors' summary)

2654
Delahaye
[AN EMERGENCY EVACUATION AT ERG CHECH] Une évacuation sanitaire dans l'Erg Chech. — Médecine aéronautique (Paris), 9 (2): 183-188. 1954. In French. DLC (TL555.M394, v.9)

The paper describes the difficult evacuation of a seriously injured French soldier from shifting sand dunes in the Sahara Desert to a field hospital over a distance of 1,300 km. Three planes were used successively in the evacuation.

2655
Delaunois, A.,
R. Maucet, and J. P. Rousseaux
[DERMATOSES CAUSED BY JET PLANE MOTOR FUELS] Dermatoses causées par les carburants des moteurs des avions à réaction. — Annales Belges de médecine militaire (Liège), 107 (8-9): 125-134. Aug.-Sept. 1954. In French, with English summary (p. 134). DNLM

Seventeen cases of acute and chronic contact dermatitis caused by kerosene on jet aircraft mechanics are reported. The symptomatology, pathogenesis, and preventive measures are discussed.

2656
Dempsey, C. A. 1953
DEVELOPMENT OF A WORKSPACE MEASURING DEVICE. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-53, March 1953. iv+4 p. (RDO no. 695-75). AD-13 206
UNCLASSIFIED

This report describes a workspace measuring device, which was developed to determine the maximum, minimum, and optimum space requirements of Air Force pilots when seated in the cockpit situation, and to simulate in the laboratory existing or proposed cockpit designs with an eye to proper space utilization. (Author's abstract)

2657
Denison, M. E.,
and M. X. Zarrow
EOSINOPHILS OF BLOOD DURING PROLONGED EXPOSURE TO COLD AND CHRONIC ADMINISTRATION OF CORTISONE ACETATE. — Proc. Soc. Exper. Biol. and Med., 85 (3): 433-437. March 1954. DLC (QP1.S8, v. 85)

Evidence has been presented to show that the circulating eosinophils do not remain depressed in rats exposed to cold for a period of 90 days. The level of eosinophils dropped 6 hours after the

animals were exposed to the cold but returned to above the normal values within 48 hours and in general remained high for the duration of the exposure. Different doses of cortisone acetate were administered to intact rats, and it was determined that a daily dose of 100 μg. was necessary to maintain a depressed level of eosinophils during the period of treatment. The evidence suggests that a eucorticoid state may develop during adaptation to cold. The permissive action of the adrenal gland and its relation to the adaptation of rats to a low environmental temperature is discussed. (Authors' conclusion)

2658
DesMarais, A. 1953
[EFFECTS OF ASCORBIC ACID ON OXYGEN CONSUMPTION AND LIVER GLYCOGEN CONTENT IN THE WHITE RAT EXPOSED TO COLD OR MAINTAINED AT NORMAL TEMPERATURE] Effets de l'acide ascorbique sur la consommation d'oxygène et la teneur en glycogène du foie chez le rat blanc exposé au froid ou maintenu à la température normale. — Revue canadienne de biologie (Montreal), 12 (1): 99-104. Sept. 1953. In French.
DLC (QH301.R47, v.12)

Administration of large amounts of ascorbic acid did not significantly alter the oxygen consumption or liver glycogen concentration of rats at room temperature. When exposed to cold (2°C), however, the ascorbic acid-treated rats showed a great increase in oxygen consumption and a diminution of liver glycogen compared to untreated controls in which the increase in oxygen consumption was delayed and the decrease of liver glycogen less pronounced.

2659
Desmarais, A.
[OXIDATIVE ACTIVITY OF DIFFERENT TISSUES OF THE WHITE RAT DURING COLD ADAPTATION] Activité oxidative de différents tissus du rat blanc au cours de l'adaptation au froid. — Revue canadienne de biologie (Montreal), 13 (2): 115-119. June 1954. In French.
DLC (QH301.R47, v. 13)

Sodium ascorbate-treated and non-treated rats were exposed to cold (+2°C.), or maintained at 23°C. Both groups of animals, when exposed to cold, demonstrated an increase in the succinic dehydrogenase content of the liver and adrenals and a decrease in the muscles. In addition, both liver and muscular glycogen contents were decreased. In treated and non-treated rats maintained at 23°C., liver succinic dehydrogenase and glycogen showed a non-significant increase as did muscular glycogen, whereas adrenal and muscular succinic dehydrogenase decreased. Liver lipids were decreased in all groups.

2660
Diamond, A. L.,
and A. S. Gilinsky
DARK-ADAPTATION LUMINANCE THRESHOLDS FOR THE RESOLUTION OF DETAIL FOLLOWING DIFFERENT DURATIONS OF LIGHT ADAPTATION [Abstract]. — Amer. Psychologist, 9 (8): 355. Aug. 1954
DLC (BF1.A55, v. 9)

The present experiment is specifically concerned with the duration of preadapting luminance with respect to visual acuity during dark adaptation. Another related parameter that is investigated is the acuity value of objects discriminated during dark adaptation. A modified Hecht-Shlaer adaptometer enabling determination of acuity thresholds during dark adaptation was used to obtain data for two subjects with normal vision. A modified psychophysical method of constant stimuli was used to determine the acuity thresholds during dark adaptation. Results lead to the following conclusions: (1) At all acuity levels, the initial thresholds rise and the speed of dark adaptation decreases as duration of preadapting light increases from 1 sec. to approx. 5 min. (2) At lower acuities (0.083 and 9.942), an additional effect occurs as a function of duration; the

shorter the period of light adaptation, the less prominent is the primary cone dark adaptation, and the sooner does the rod dark adaptation appear. And (3) as the level of acuity increases, the threshold luminance also increases, depending upon the amount of change in acuity and the preadapting duration. (Abstract, modified)

2661
Dice, H. E.
SCHOOL FOR SAFETY. — Combat Crew, 5 (2): 26-28. Aug. 1954. DLC

The School for Flight Safety Officers was founded in March 1953 to acquaint flying safety officers with techniques of effective teaching and dissemination of flying safety practices. The curriculum of the six-week course includes courses on aviation physiology and psychology, aeronautical engineering, accident investigation and prevention, educational principles, field trips, as well as participation in actual human centrifuge runs, with and without an anti-g suit.

2662
Dickinson, F.
NOTES ON A NEW GERMAN CORNEAL CONTACT LENS. — Amer. Jour. Optometry, 31 (7): 378-381. July 1954. DLC (RE1.A37, v 31)

The author reports on the success of a simple type of corneal contact lens developed and fitted by Wilhelm Söhnges in Germany. Among the wearers, who were interviewed by the author, was an American airman, who had worn his lenses continuously, day and night, for three months without ill effects. Moreover, he experienced no photophobia but claimed increased tolerance of light.

2663
Dickson, E. D. D. 1952
EFFECTS OF INTENSE SOUND. — Lancet (London), 263 (6742): 967-968. Nov. 15, 1952 DLC (R31.L3, v 263)

The effects of intense sound and ultrasound on the ear are briefly discussed. It is noted that acoustic trauma may be caused by a noise of 90 decibels. Among flight personnel the tendency towards hearing disorders is greater from multi-engine than from single-engine airplanes Exposure to intense jet engine sound (2000 cycles per second, and 145 decibels of intensity) can cause considerable hearing loss for higher tones, and extremely severe tinnitus. In comparison, the frequencies of ultrasound have little or no effect on hearing. It is noted that intensity rather than frequency of a sound produces the damage.

2664
Dickson, E. D. D.,
R. Hinchcliffe, and L. J. Wheeler
EAR DEFENDERS: AN INVESTIGATION INTO THEIR ATTENUATING PROPERTIES. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 884, June 1954. 106 + iii p. AD 49 694 UNCLASSIFIED

Subjects were selected at random from the male personnel of an RAF unit and given a clinical otorhinological examination. Each of 20 subjects was tested with each of several ear defenders; these were of the insert, noise occluding pad, and helmet types. The subject was seated in a sound-proof booth with his head fixed by a chin rest and head support. His free-field pure-tone threshold was determined by the standard audiometric procedures. An ear-defender pair was then fitted and the threshold redetermined. Tape-recorded aircraft noise was replayed for a predetermined duration of 1/2, 1, or 2 hours with the amplification adjusted to a 123-db. sound pressure level at the head position. Immediately after the cessation of the noise, the ear defenders were removed and the pressure-field pure-tone threshold was rechecked The results showed that all the ear defenders have an attenuation curve which rises with frequency in the 250- to 3000-c.p.m. range. Of the 16 defenders tested, the Acoustics Laboratory Mk VI headpiece

was concluded to be the best on the basis of attenuation properties, constancy of attention, and comfort. (AD abstract)

2665
Dickson, E. D. D.,
R. Hinchcliffe, and L. J. Wheeler
EFFECT ON AUDITORY FATIGUE OF SEALING AND FITTING TAIL-PIPE EXHAUSTS TO THE SHACKLETON MK III [sic]. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 874, April 1954. 15 p. AD 39 998
UNCLASSIFIED

Pre- and post-flight hearing levels were determined by individual pure tone audiometry in eleven officers and men of the Shackleton Aircrew. Each check was done at least four days after any flight so that the individual would have, by that time, recovered from any auditory fatigue. The following conclusions were reached: Flying in the sealed version of the Mk. II Shackleton (WG 531) is less fatiguing, as regards hearing, than in the standard version. Fitting of tail-pipe exhausts to the sealed aircraft produces a further improvement for the pilots and (although probably not significant) for the crew as a whole, with the exception of engineers and, possibly, navigators. Engineers appear to suffer the same auditory fatigue in the sealed aircraft fitted with tail-pipe exhausts as in the standard Shackleton Mk. II fitted with stub exhausts. Therefore, from the otological aspect, sealing offers a decided improvement, but fitting tail-pipe exhausts in addition to sealing does not, since fitting the sealed Mk. II with these exhausts lowers the auditory fatigue of pilots at the expense of engineers and, probably, the navigators. (Authors' conclusions, modified)

2666
Dickson, E. D. D.
UPPER RESPIRATORY INFECTION IN AIR TRAVEL. — Practitioner (London), 173 (1038): 678-682. Dec. 1954.
DNLM

The physical and physiological causes of barotrauma are discussed. Otitic and sinus barotrauma are differentiated, and their clinical manifestations, prophylaxis, and treatment are considered.

2667
Dill, D. B.
WALTER BOOTHBY, PIONEER IN AVIATION MEDICINE. — Science, 120 (3122): 688. Oct. 29, 1954.
DLC (Q1.S35, v. 120)

The life and work of Walter M. Boothby is reviewed. During his long association with military medicine his interests were directed to the solution of the problem of oxygen supply to pilots at high altitudes. The Mayo Section of Aviation Medicine headed by Boothby played a major role in the development of the A-14 mask. After retirement he edited a compendium of information on respiratory data for aviation medicine.

2668
Doane, B. K.
A FACTORIAL STUDY OF INTEGRATION.— Canad. Jour. Psychol. (Toronto), 8 (2): 61-69. June 1954.
DLC (BF1. C3, v.8)

This study was undertaken to review the interpretations of three integration factors found in the U. S. Army Air Force aircrew selection tests, and to develop new group tests of complex mental operations valid for future pilot selection. Three tests were developed for each of the integration factors on the basis of proposed hypotheses. Thurstone's Verbal Analogies and Numbers Series were used as reference tests. The assembled battery of eleven tests was administered to 111 flight cadets in the Royal Canadian Air Force. Raw scores obtained were used for computing the intercorrelations. Five factors were extracted from the table of intercorrelations using Thurstone's complete centroid method. An oblique simple structure was obtained after rotationg axes by Thrustone's method of Extended

Vectors. Three of the five factors approximated the hypotheses used in constructing the test battery. Proposed tentative labels are: (1) Factor A (integration I)—serial operations, (2) Factor B (Integration II)—speed of reasoning, (3) Factor C (Integration III) — planning capacity, (4) Factor D — speed of recognition, and (5) Factor E— ordinal facility. It is suggested that six of the experimental tests be developed for future usage.

2669

Dobin, N. B., 1953
O. E. Hepler, I. C. Sherman, H. A. Friedman, and R. Sellman
STUDIES IN TEMPERATURE REGULATION. I. RESPONSE OF NORMAL MEN TO CHANGES IN ENVIRONMENTAL TEMPERATURE. — Neurology, 3 (3): 185-201. March 1953.
DLC (RC321.A47, v. 3)

Seven healthy male subjects were immersed on different days in hot (102°F.), tepid (93°F.) and cold (65°F.) water at a constant temperature to the level of the axilla, xiphoid, and umbilicus. The degree of change in body temperature was directly proportional to the volume and surface area of the body submerged in the bath. The rise in body temperature in water of 102°F. and 93°F. is due to a diminution in the rate of heat loss, an increase in the rate of heat storage, and, to a lesser degree, to an increase in the rate of heat production. The fall in body temperature in water of 65°F. is due to an increase in the rate of heat loss and a depletion of body heat storage. Oxygen consumption is increased more in the cold than in warm environment proportionally to the fraction of body immersed. Both systolic and diastolic blood pressures show an initial drop and then a gradual rise almost to the pre-immersion level in warm water. A slight, gradual rise in both systolic and diastolic pressures occurs in cold water. The increase in blood cells, hemoglobin, hematocrit, total protein, albumin, and specific gravity of the blood in both warm and cold immersions is believed to be due to relative hemoconcentration.

2670

Doenges, F. P.,
Ernest W. Smith, S. P. Wise, and R. B. Breitenbucher
SPLENIC INFARCTION FOLLOWING AIR TRAVEL AND ASSOCIATED WITH THE SICKLING PHENOMENON. — Jour. Amer. Med. Assoc., 156 (10): 955-957. Nov. 6, 1954.
DLC (R15.A48, v. 156)

The diagnosis of sickle cell-hemoglobin C disease was made in two patients on the basis of electrophoretic studies of the hemoglobin. In one of the subjects the clinical impression was also substantiated by the presence of target cells in the peripheral blood. The symptom complex of both patients closely parallels the so-called triad of splenic infarction, sicklemia, and high-altitude flying often reported upon. It is felt that sickle cell-hemoglobin C disease rather than sicklemia is actually the determining factor. It is suggested that in future occurrences of splenic infarction a genetic diagnosis be established. If it turns out that both the sickling factor and C hemoglobin are prerequisites, then the percentage of Negroes who, according to the present triad theory, face potential hazard in air travel would be greatly reduced.

2671

Doesschate, G. ten,
and J. Kylstra
[DEPTH PERCEPTION IN THE PERIPHERY OF THE VISUAL FIELD] Diepteonderscheidingsvermogen in de peripherie van het gezichtsveld. — Aeromedica acta (Soesterberg, Netherlands), 3: 179-185. 1954. In Dutch.
DNLM

A new test procedure employing a modified two-rod apparatus with both rods mobile was developed to investigate depth perception in the periphery of the retina. This test requires on the part of the subject good overall depth

perception, the ability to maintain focus, considerable concentration, and a good deal of patience. Because of the small number of subjects tested the following observations should be evaluated with certain reservations: (1) Whenever the subjects were able to move their eyes freely, the setting errors were smaller in proportion to the distance between rods, except for the distances of 75 cm. and 100 cm. between the rods. (2) Whenever the eyes were fixated so that the rods formed an image in the periphery of the retina, the depth evaluation became extremely difficult or impossible if the rods were moved close to each other. (3) Peripheral depth perception was at its optimum when the distance between the rods was set at 75 cm. and 100 cm. (4) Depth perception decreased from the central retina to the peripheral areas more slowly than visual acuity. These findings become important in the evaluation of horizontal distance during landings. As the eyes move in a definite direction, the landing lights are perceived peripherally. The following proportion for the relative distance (ij) between the rows of landing lights is suggested as optimum: ij:1 (or 0.75)= h (altitude): 3.62, whereby both ij and h are expressed in meters. Thus, whenever the airplane is at an altitude of 200 m. the most favorable distance between the two rows of landing lights should be ±55 (±41) m.

2672
Doesschate, G. ten
[DEPTH DISCRIMINATION AT GREAT DISTANCE] Diepte-onderscheidingsvermogen op grote afstand. — Nederlandsch tijdschrift voor geneeskunde (Amsterdam), 98 (22): 1495-1501. May 29, 1954. In Dutch, with English summary (p. 1501) DNLM

The average error of depth discrimination of 100 young men with normal eyesight, for objects as far as 50 meters away, was approximately one meter. The binocular parallax, exclusive of the effects of the other third dimension generators, obviously enables the subject to judge the range with considerable accuracy at this great distance. No appreciable correlation could be found between the discriminatory power at 6 or 50 meters distance. At the greater distance, expert flyers made errors which were no smaller than those of inexperienced subjects. (Author's abstract, modified)

2673
Doesschate, G. ten,
and J. T. H. van Weeren
[INTERPUPILLARY DISTANCE AND DEPTH PERCEPTION] Pupil-afstand en Diepte-onderscheidingsvermogen. — Aeromedica acta (Soesterberg, Netherlands), 3: 175-177. 1954. In Dutch. DNLM

Contrary to the proposed hypothesis that constant defects in depth perception, as measured by a three-rod apparatus, will be inversely proportional to the interocular distance, experiments have demonstrated that the effects of the magnitude of the parallax angle may be masked by other factors, e.g., esophoria.

2674
Doesschate, G. ten,
and M. P. Lansberg
TIME CONSUMPTION IN EYE MOVEMENTS. — Aeromedica acta (Soesterberg, Netherlands), 3: 277-279. 1954. In English. DNLM

Time spent by a pilot traveling at high speed in looking at indicators results in blind-flying intervals. Time spent in shifting the eyes is wasteful as compared to useful time spent in taking instrument-panel readings. The corneo-retinal potential constitutes an easy and reliable means of registering rapid eye movements relative to the orbit. It is picked up by two electrodes placed on the temples and recorded by an electroencephalograph or an electrocardiograph. A disturbance (50 c. p. s.) from an electric apparatus placed near the subject was used as a time indicator for obtaining a quick survey of the registered curves.

2675
Doesschate, G. ten,
and J. Kylstra

[VISUAL AIDS FOR LANDINGS UNDER ADVERSE CONDITIONS IN COMBINATION WITH THE APPEARANCE OF OPTICAL ILLUSIONS] Visuele hulpmiddelen bij landingen onder moeilijke omstandigheden in verband met het optreden van zinsbedrog. — Aeromedica acta (Soesterberg, Netherlands), 3: 139-174. 1954. In Dutch. DNLM

This is an interim report on the work concerning optical illusions undertaken by the Institute of the National Aeromedical Center at Soesterberg (Stichting Nationaal Luchtvaart-geneeskundig Centrum te Soesterberg). It is well known that a pilot's judgment of distance and altitude may be influenced by illusions appearing under adverse conditions, e. g., during landings using visual approach in darkness, rain, and mist. In a first series of experiments, it was attempted to determine the value of using a cross-bar of lights between two parallel rows of guide lights. Some of the variables investigated were the position of the observer in reference to the lights, monocular vision, binocular vision, distance between the two rows, and a split crossbar whereby the lengths of the halves were varied. In a second series of experiments, the degree of illusion of convergence of two parallel lines, when the head of the observer was held in various abnormal positions was investigated. It was found that at abnormal body positions the depth perception is decreased and the subjective estimate of the location of figures deviates from the actual location. The performance of experienced pilots indicated that it is possible to counteract these illusions and correct the distance estimates through training and specially designed visual aids. Since the size of the visual angle is approximately inversely proportional to the distance, it would be possible for a pilot perceiving an object of known height to estimate correctly the distance to this object. It is therefore suggested that figures of a standardized size (such as Landolt rings) be constructed in all airports. Thus the pilot can learn by experience at what distance the breaks in the rings become visible and correctly estimate distances and altitude. Further research is needed to determine the best shape and size for such visual aids.

2676
*[Dolbin, T. V.] 1953
[FOOD HYGIENE OF FLIGHT PERSONNEL OF THE CIVIL AIR FORCE.] Gigiena pitaniîa letnogo sostava grazhdanskogo vozdushnogo flota. — Moskva, 1953. 40 p. In Russian. Russian.

See item no. 3312

2677
Dollfus, A.

[INVESTIGATIONS ON WATER VAPOR IN THE ATMOSPHERE OF THE PLANET MARS, CARRIED OUT FROM A FREE BALLOON AT 7000 METER ALTITUDE] Recherche de la vapeur d'eau dans l'atmosphère de la planète Mars, fait on ballon libre, vers 7000 m d'altitude. — Comptes rendus de l'Académie des sciences (Paris), 239 (16): 954-956. Oct. 18, 1954. In French. DLC (Q46.A14, v. 239)

Measurements of polarization on the planet Mars carried out by the author since 1948 indicated that its polar caps are covered with hoarfrost and with ice clouds. However, spectrographic investigations of the atmosphere of Mars did not clearly reveal the existence of water vapor. The air seems to have a temperature of -27°C. corresponding to that on Earth at altitudes of 6500 m. However, the temperature on Mars decreases twice as fast with increasing altitude than it does on Earth. The cloud phenomena observed on Mars indicate a hygrometric status similar to that which prevails on Earth above 6500 m. The author made an ascent by free balloon and reached an altitude

of 7000 m. in 3 hours. A spectroscope with monochromatic filters isolated the area around 8250 Å which indicates water vapor. At the altitude of 7000 m. the water vapor on Earth gave 0.25 mm. precipitable water, which is about one hundredth of the precipitation on the Earth's surface. The water content of the planet Mars is without doubt of the same magnitude.

2678

Domanski, T. J.

PHYSIOLOGICAL RECOGNITION OF STRAIN IN FLYING PERSONNEL: EOSINOPENIA IN B-29 TRAINING OPERATIONS. — School of Aviation Medicine, Randolph Field, Tex. April 1954. iii+11 p. (Project no. 21-1208-0005, Report no. 4). AD 33 777 PB114172

Based upon the study of the aircraft commander, navigator, radar observer, and flight engineer of each of five randomly selected student aircrews undergoing B-29 combat-crew training, the incidence of post-flight eosinopenia was 41%. The incidence of eosinopenia was 25% for aircraft commanders, 64% for navigators, 63% for radar observers, and 5% for flight engineers. A total of 101 man-missions was studied. The incidence of eosinopenia among the several aircrew positions studied was found to be in essential agreement with the judgment of B-29 instructors as to the relative level of difficulty (mental strain) associated with the four jobs. The blood eosinophil response data discloses a significant difference ($P<.02$) between the positions of navigator and radar observer, as compared with the position of flight engineer. (Author's abstract)

2679

Donhoffer, S., 1953
G. Mestyán, E. Obrincsák, T. Pap, and I. Tóth

THE THERMOREGULATORY SIGNIFICANCE OF THE INCREASE IN O_2-CONSUMPTION ELICITED BY HIGH ENVIRONMENTAL TEMPERATURE. — Acta physiologica academiae scientiarum hungaricae (Budapest), 4 (3-4): 291-299. 1953. In English DNLM

The analysis of body temperature and O_2 consumption of normal, thyroidectomized, hypophysectomized, and methylthiouracil-treated rats shows that (1) increased O_2 consumption in hyperthermia following exposure to heat is not a manifestation of van't Hoff's rule; (2) there is no evidence supporting the assumption that the increased O_2 consumption in the normal hyperthermic animal is due to an increased activity, and consequently, an increased O_2 demand of the mechanisms controlling heat loss; (3) passive hyperthermia is, within certain limits, not really passive, but represents regulation at a higher level, which can be maintained in spite of varying heat production. (Authors' summary, modified)

2680

Dose, R. G.,
and T. G. Dickinson

VISIBILITY OF COCKPIT INSTRUMENTS AT HIGH ALTITUDE. — Jour. Aviation Med., 25 (3): 260-264, 288. 1954. DLC (TL555.A1A4, v. 25)

The visibility of cockpit instruments was studied at various altitudes. A TV-2 jet trainer was flown to an altitude of 43,500 feet. During the flight, the sun was kept at a constant bearing in relation to the aircraft. Photographs were taken of a white card mounted on the instrument panel, and light-intensity recordings were made at sea level and at altitudes of 5,000 to 43,500 ft. The photographs showed a constant increase in density of light up to 15,000 ft., then a lessening. The light-meter readings decreased constantly with increased altitude. Undoubtedly, the densitometer readings of the exposed film were more sensitive than those of the light meter, thus accounting for the increased density readings up to 15,000 ft. Above this height, a decrease in light transmission was due to decreased molecular density of the atmosphere.

The author concludes that there is no decrease in cockpit instrument visibility of practical significance under the conditions described in the experiment.

2681
Douglas, C. G.
PULMONARY FUNCTION: HISTORICAL. — In: (School Aviation Med.). Respiratory physiology in aviation, p. 1-18. Randolph Field, Tex. Sept. 1954. (Project no. 21-2301-0003). AD 49 179 PB121739

This is a historical survey of various aspects of the complex pulmonary physiology relevant to aviation medicine, discussing in turn various approaches to the etiology of hyperpnea, effects of high and reduced barometric pressure, effects of CO_2 on respiratory centers and its relation to hydrogen ion concentration of the blood, and muscular work and lactic acid concentration. The functional regulation of breathing and related aspects are reviewed, including periodic breathing, the identification of chemoreceptors in the aortic and carotid bodies, composition and measurement of alveolar air, and relation of hyperpnea and muscular exercise. Acclimatization at high altitude involves problems such as the dissociation of oxyhemoglobin, the effect of reduced O_2 pressure above 10,000 ft., and the significance of uneven ventilation. (140 references)

2682
Duane, T. D.
OBSERVATIONS ON THE FUNDUS OCULI DURING BLACK-OUT. — Arch. Ophthalmol., 51 (3): 343-355. March 1954. DLC (RE1.A62, v. 51)

Ophthalmoscopic observations were made of the fundus oculi of 19 human subjects undergoing blackout secondary to positive acceleration. The experiments were designed and conducted so that the subject could record his blackout experiences while retinal changes were concurrently being observed, and a direct correlation was established between subjective and objective findings. The following three stages of change were noted by the observer during blackout and recovery: (1) initial arteriolar pulsations; (2) arteriolar exsanguination and collapse; and (3) return of arteriolar pulsation and transient venous distention. Concomitant subjective changes were recorded, respectively, as follows: (1) peripheral light loss and graying; (2) loss of central light and blackout; and (3) return of central and peripheral lights. Changes usually occurred one or two seconds after arrival at the 4.5 g level. It was concluded that during positive acceleration blackout is accompanied by a retinal arteriolar ischemia, suggesting that anoxia of the inner retinal cells is responsible for the phenomenon. The arterial pressure in one human subject was measured during blackout and a correlation between effective systolic pressure and the symptoms and signs of blackout was made. Anesthetized chimpanzees presented objective signs of blackout at 3.5 g. A monkey exposed to positive g showed objective signs of blackout in the region of 7 g (a level slightly higher than that for humans). It is stated that the findings are so consistent that they can be used as a standard index for the physiological changes occurring during positive acceleration in a subject or species whose tolerance has not been determined.

2683
DuBois, A. B.,
A. W. Brody, D. H. Lewis, and B. F. Burgess
RESPONSE OF CHEST WALL, ABDOMEN AND DIAPHRAGM TO FORCED OSCILLATIONS OF VOLUME. — Federation Proceedings, 13 (1^{1}): 38. 1954. DLC (QH301.F37, v. 13)

Previous studies tested the frequency response of the lung-thorax system to sinusoidal air pumping at the mouth by comparing airflow into the mouth with transthoracic pressure. This permits separation of the total impedance to breathing into resistive, elastic, and inertial components. To test whether

the chest wall, abdomen, and diaphragm move together or as separate systems, velocity pick-ups (magnet and coils) were placed on the body surface during such sinusoidal pumping. At 7-11 c.p.s., velocity over the upper anterior chest was in phase with mouth pressure in 10 supine subjects, and a maximum occurred in velocity and displacement (.11 to .24 mm. at a pump stroke 14 c.c.). At 5-8 c.p.s., the abdomen showed a maximal amplitude (1.3-1.9 mm. at pump stroke 56 c.c.), and at 3.4-4.1 c.p.s. the body had a maximum head-foot displacement measured by the Dock ballistocardiograph in 6 subjects (.14 to .29 mm. at pump stroke 56 c.c.). At 1-2 c.p.s., the anterior chest and abdominal surface moved nearly together, in phase. At higher frequencies, the surface motion of the abdomen lagged the upper chest, and this lag increased caudally. Above 4 c.p.s., the lower chest also lagged the upper. (From the authors' summary)

2684
Ducros, E.,
and R. Grégoire
[SPINE INJURIES IN FLIGHT ACCIDENTS OF THE FRENCH AIR FORCE] Atteintes vertébrales dans les accidents aériens (Armée de l'Air). — Médecine aéronautique (Paris), 9 (4): 483-487. 1954. In French.
DLC (TL555.M394, v. 9)

The statistical data of the French Air Force for the years 1950 to 1953 show that vertebral lesions were found in 42.5% of the fatal injuries and 11.5% of the non-fatal injuries. A breakdown of these statistics is presented according to the type of injuries and the type of airplane and descriptions are given of 13 cases of injured fliers exemplifying the most common involvements of the backbone.

2685
Ducros, E.,
and R. Grégoire
[INJURIES IN JET FLYING] Traumatologie dans l'aviation à réaction. — Médecine aéronautique (Paris), 9 (3): 213-222. 1954. In French.
DLC (TL555.M394, v. 9)

The records of 245 jet plane accidents that occurred in France from 1950 to 1953 were analyzed from a medical and statistical point of view. On the basis of this analysis the following conclusions are drawn: (1) the ratio of deaths to non-fatal injury was nearly 4 to 1. (2) 75% of the deaths were caused by far-reaching body mutilations due to explosion or fire, often leading to complete disintegration. (3) The number of the wounded was extremely low (6 per 100 accidents) and the injuries relatively light. (4) Among the wounded no head injury was reported. The most affected part of the body was the dorso-lumbar region. Although the safety harnesses prevented the pilot from being catapulted against the wall, they did offer no protection against injury of the vertebral column. (5) The necessity is apparent to search for supplementary protective devices, which on the one hand should be more flexible, on the other more shock-absorbent, and also allow the pilot to adjust his position so as to minimize vertebral injuries.

2686
Duerfeldt, C. H.
PILOT'S PROTECTIVE HELMET N-2, MANUFACTURED BY MINE SAFETY APPLIANCES COMPANY: EVALUATION FOR SERVICE USE. — Naval Air Test Center, Patuxent River, Md. [Serial no.] ST34-139. Report no. 1 (Final Report), Oct. 1, 1954. i+6+1 p. (Project TED no. PTR AE-5203.2). AD 45 258
UNCLASSIFIED

This report covers the evaluation of the prototype N-2 pilot's protective helmet. The N-2 protective helmet is unsatisfactory for service use because the noise attenuating quality of the helmet is very poor, the visor is not retained in the slots when in the full down position, and the lens is not sufficiently dark in shade. It is recommended that the following improvements be made: the noise attenuating

quality of the helmet be improved, the retention of the visor in the down position be more positive, the lens be constructed of a darker material, and the wiring harness be modified to accommodate a single plug for the oxygen mask microphone. (Author's summary)

2687
Duerfeldt, C. H.
PILOTS' PROTECTIVE HELMET H-5, AND GOGGLES, MODEL GL-1 TYPE H-4, MANUFACTURED BY GENERAL TEXTILE MILLS, INC.: EVALUATION FOR SERVICE USE. — Naval Air Test Center, Patuxent River, Md. [Serial no.] ST34-147. Report no. 1 (Final Report), Oct. 18, 1954. i+6+1p. (Project TED no. PTR-AE-5203.1) AD 45 542 UNCLASSIFIED

This report covers the evaluation of the prototype H-5 pilot's protective helmet and Model GL-1 type H-4 goggles. The H-5 pilot's protective helmet and Model GL-1 type H-4 goggles are unsatisfactory for service use because the web suspension causes a pressure point at the top of the head, the goggles do not integrate properly with the helmet to afford adequate vision, the noise attenuating quality of the helmet is inadequate, and the stability of the helmet is not sufficient during the various conditions of flight. It is recommended that the basic configuration of the helmet be retained, but that the unsatisfactory items be corrected to make the helmet suitable for service use, and that the goggles be abandoned in lieu of a visor-type goggle. (Author's abstract)

2688
Dugal, L. P., 1952
and G. Fortier
ASCORBIC ACID AND ACCLIMATIZATION TO COLD IN MONKEYS. — Jour. Applied Physiol., 5 (3): 143-146. Sept. 1952. DLC (QP1.J72, v. 5)

Monkeys pre-exposed to mild cold (10°C.) for 6 months and receiving 25 mg. of vitamin C daily do not resist intense cold (-20°C.) better than the controls kept at room temperature and receiving the same amount of vitamin C daily. On the other hand, monkeys subjected to the same conditions but receiving 325 mg. of vitamin C daily are far more resistant to intense cold than the controls kept at room temperature, and more than the group pre-exposed to cold but receiving only 25 mg. of vitamin C daily. (Authors' summary, modified)

2689
Dugal, L. P.
ACCLIMATIZATION TO COLD ENVIRONMENT. — In: Spector, H. and M. S. Peterson, (ed.), Nutrition under climatic stress . . . , p. 70-81; discussion, p. 98-101. Nat. Acad. of Sci. – Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 PB117996

Although there is still controversy about acclimatization to cold in man, as far as animals are concerned there is considerable agreement that acclimatization to cold exists. A review of experimental work on resistance to intense cold of animals unable to synthetize vitamin C shows that, in general, the highest resistance was attained in animals which had been pre-exposed to mild cold for a prolonged time receiving at the same time daily massive doses of ascorbic acid.

2690
Du Monceau de Bergendal
[AGE AND THE FIGHTER PILOT] L'age et le pilote de chasse. — Médecine aéronautique (Paris), 9 (1): 67-69. 1954. DLC (TL555.M394, v. 9)
Also published in: Annales Belges de médecine militaire (Liège), 107 (6-7): 108-111. June-July 1954. In French.

In order to function efficiently, a fighter pilot must be free from preoccupations, worries, anxiety, and restlessness. High altitudes and high speeds subject him to extreme physiological fatigue, and problems and

strains of aerial combat produce physical and mental fatigue. Though it must be recognized that experience comes with age, additional responsibilities and problems (marriage and raising of a family) create further problems and concerns, while physical resistance decreases. It has been found that the human being attains his maximum physical vigor, physiological resistance and psychological enthusiasm between the ages of 18 and 30 years. Pilots should be relieved of administrative duties by employing specialized officers to handle this work. In regard to these factors, medical specialists must attempt to find every means possible to reduce their effects on the fighter pilot.

2691
Du Monceau de Bergendal
[FATIGUE OF THE FIGHTER PILOT] La fatigue du pilote de chasse. — Annales Belges de médecine militaire (Liège), 107 (6-7): 116-117. June-July 1954. In French. DNLM

The following types of fatigue in military fighter pilots are enumerated: (1) mental fatigue due to concentration on the cockpit apparatus; (2) emotional or nervous fatigue caused by constant attention and action; (3) combined mental and moral fatigue; and (4) physical fatigue due to acceleration, altitude changes, O_2 deficiency, etc. Rest and sleep are of therapeutic value for fatigue.

2692
Duncan-Weatherley, A. H. 1952
THE VENTILATORY RESPONSE TO LOW CONCENTRATIONS OF CARBON DIOXIDE IN NORMAL YOUNG MEN. — Australian Jour. Exper. Biol. and Med. Sci. (Adelaide), 30 (1): 95-104. Feb. 1952. DLC (QH301.A8, v. 30)

The effects of low percentages of CO_2 in the inspired air on the ventilation of normal young men were measured employing constant mixtures of CO_2 with air. The subjects inspired mixtures containing 2%, 4%, and 6% CO_2 from Douglas bags and expired through a gas meter. The ventilation rate increased at first sharply over the resting level, then the increase became slower, finally reaching a plateau, which is defined as a set of consecutive ventilation rates with not more than ±10% deviation. The means of the times elapsed until a plateau was reached for 2%, 4%, and 6% CO_2 mixtures were, respectively, 2.3 min., 2.4 min., and 1.9 min. The data were evaluated statistically by analysis of variance. The methods of measurement have been compared with those of other authors, and the advantages of the "plateau" method discussed.

2693
Dundee, J. W.,
and P. R. Mesham
GENERALIZED HYPOTHERMIA. — South African Med. Jour. (Cape Town), 28 (28): 585-588. July 1954. DLC (R98.S63, v. 28)

The history and advantages of use of generalized hypothermia in surgery are discussed. Research on cardiovascular effects of cold has not yet led to any definite conclusions. The salient features are fall in heart rate and blood pressure, slowing of cardiac conduction, drop in cardiac output, rise in venous pressure, and increase in cardiac irritability. These effects become particularly marked at temperatures below 28°C. Cardiac irritability, especially, culminating in ventricular fibrillation, is one of the chief problems of deep hypothermia. Measures taken to counteract these effects consist of hyperventilation during cooling, combined with injection of KCl into the coronary circulation should ventricular fibrillation develop. In general, hypothermia may be aided by the use of a "lytic cocktail", consisting of chloropromazine, pethidine, and promethazine; it is best produced by surface cooling by means of ice bags, refrigerating blanket, or immersion of the anesthetized patient in ice water. Experiences with 50 cases are described. The authors feel that deep

hypothermia, while offering great possibilities, cannot yet be safely employed. Mild hypothermia is a relatively safe procedure and of value in selected cases.

2694

Dusek, E. R.,

W. H. Teichner, and J. L. Kobrick

EFFECTS OF THE ANGULAR RELATIONSHIPS BETWEEN THE OBSERVER AND THE BASE-SURROUND OF THE STIMULI ON RELATIVE DEPTH DISCRIMINATION. — Quartermaster Research and Development Center. Environmental Protection Div., Natick, Mass. Report no. 232, June 1954. 10 p. AD-39 305

UNCLASSIFIED

Four subjects were used in a study of depth discrimination with a modification of the Howard-Dolman apparatus. Analysis of the three variables studied in a replicated factorial type design indicates that the linear threshold of equality settings is: (1) a decreasing function of the frontal slope of the base-surround of the stimuli, (2) an increasing function of viewing distance, and (3) a decreasing function of eye level height. Practice effects as revealed by the replications tended to increase the precision of the subject's depth discrimination judgments. In addition it was concluded that frontal slope, viewing distance, and eye level height each affects the angular relationship between the subject's line of sight and the base-surround of the targets. (Authors' summary and conclusions)

2695

Eagles, J. B., 1953

A. M. Halliday, and J. W. T. Redfearn

THE EFFECTS OF FATIGUE ON TREMOR. — In: Floyd, W. F. and A. T. Welford, ed. Symposium on Fatigue, p. 41-58. London: H. K. Lewis and Co., Ltd., 1953 DNLM

A study was made of finger tremor under conditions of sleep deprivation, acute and chronic exercise of the index finger (with recordings of tremor of the same finger), and acute and chronic exertion involving the whole body. Three wave bands can be distinguished in the recordings of finger tremor: (1) fast activity of 20-30 c.p.s. related to the natural frequency of that part of the body, (2) medium activity of 6-12 c.p.s. dominant in normal recordings and markedly increased during states of emotion and in psychoneurotics, and (3) slow activity at 2-4 c.p.s. During a 48-hour sleep deprivation, the subjects exhibited apathy, diminished affect and motivation, and muscular relaxation. The increasing muscular relaxation was reflected in a decline of the amount and fluctuation of finger tremor. During acute exertion, limited or general, a characteristic increase in the slow band of 2-4 cycles per second associated with exhaustion and local fatigue symptoms took place. This change was not observed when, after chronic exercise, exhaustion and fatigue were not experienced.

2696

Eastman, N. J.

MOUNT EVEREST IN UTERO: PRESIDENT'S ADDRESS. — Amer. Jour. Obstetrics and Gynecol., 67 (4): 701-711. April 1954. DNLM

The history, physiology, and clinical symptoms of high-altitude anoxia are reviewed, starting with the observations of Marco Polo in 1298 when he crossed the plateau of Pamir in Central Asia, through the extensive and detailed information provided during World War II, and on through the important data acquired in mountain climbing expeditions during the 1950's. The environmental conditions at high altitudes and the processes of acclimatization are compared with the environment and adaptation processes of the foetus in utero. The environment of the foetus in utero corresponds to an atmosphere in which the partial pressure of O_2 is the same as that at three quarters of a mile above Mount Everest, that is, 33,000 ft., or an O_2 pressure of 40 mm.

Hg. The foetus compensates, as an adult does, by a pronounced increase in hemoglobin value up to approximately 17 grams/100 cc. (approximately 20% higher than that obtained in the average adult or older child). This approaches the degree of acclimatization which Haldane and Henderson found developed in residents at 14,000 ft. after about a month. Foetal blood also resembles that of mountaineers in showing other evidence of increased bone marrow activity, i.e., the presence of nucleated red cells, polychromatophilia, anisocytosis, and poikilocytosis.

2697
Echols, L. M. 1953
EVALUATION OF METHODS OF GENERATING OXYGEN FROM SOLID CHEMICALS FOR AIRCRAFT BREATHING SYSTEMS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Memorandum Report WCRD no. 53-10, Feb. 11, 1953. 6 p. (E. O. no. R-660-167). AD-10 360 UNCLASSIFIED

This is a review of the information available on the feasibility of using solid chemical substances as oxygen sources in aircraft. Three systems are discussed: (1) chelate compounds which absorb and evolve oxygen according to the ambient concentration of oxygen (the oxygen pressure is, however, too low to be of value); (2) alkaline oxides which react with exhaled gases (also inefficient); and (3) "chlorate candles", consisting of iron filings and sodium chlorate, which liberate oxygen at temperatures above 300°C. (i.e., after being ignited). Although the chlorate candles supply large amounts of oxygen at an adequate rate, they are not recommended because of the hazards of explosions and spontaneous ignition due apparently to impurities present in the mixtures.

2698
Eckel, W.
[ELECTROPHYSIOLOGIC AND HISTOLOGIC INVESTIGATIONS OF THE VESTIBULAR APPARATUS DURING ROTATION] Elektrophysiologische und histologische Untersuchungen im Vestibulariskerngebiet bei Drehreizen. — Archiv für Ohren- Nasen- und Kehlkopfheilkunde (Berlin), 164 (6): 487-513. 1954. In German. DNLM

The effect of horizontal rotation on the electrical activity of the vestibular apparatus in rabbits was investigated. After freeing of the medulla oblongata, a microelectrode was placed in a single neuron of the apparatus, and activity was observed. On short turns (approximately one-third circle in one to two seconds), three types of vestibular reactions were observed. The first, occurring in approximately three-quarters of the neurons registered, consisted of an increase in electrical activity of the vestibular organ after rotation towards the same side, and a decrease from the rest activity level after rotation towards the opposite side. The opposite effect was observed during prolonged turns. In the second type of reaction, found in approximately one-fourth of the neurons studied, an increase in activity with rotation to either side and a decrease in impulse frequency with a prolonged turn were noted. A third type of reaction observed was a momentary inhibition of activity upon rotation to either side. After retardation the impulse reappeared. The activity changes during rotation were attributed to cupula displacement. An attempt was made to locate the site of reaction by histologic examination of the dye-marked electrode area. The vestibular turning reaction was found to be located in the first and second types in the triangular nucleus and in Deiters' nucleus. The location of the third type of reaction could not be found. The different activity states of the left and right vestibular apparatus in the same rotation were also investigated. A rise and subsequent decrease in activity in relation to the activity of the opposite vestibular apparatus upon rotation towards the side in point was noted.

2699
Edelberg, R.,
H. S. Weiss, P. V. Charland, and J. I. Rosenbaum
THE PHYSIOLOGY OF SIMPLE TUMBLING. I. ANIMAL STUDIES. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-139, Part 1, Jan. 1954. vii+35p. (RDO no. 695-61). AD 36 304
UNCLASSIFIED

The tumbling that follows emergency escape from an aircraft by seat ejection or that occurs during prolonged free-fall poses a threat to the escaping crewman. Tumbling was simulated in the laboratory on a horizontal spintable using anesthetized dogs as subjects preliminary to human experimentation. The axis of rotation was through the heart or at various locations up to 20 cm. caudad. The centrifugal forces proved effective in producing peripheral pooling with a consequent reduction in heart filling and cardiac output, as evidenced by the reduced pulse pressure and arteriovenous pressure difference. The decrease in perfusion pressure and the accompanying apnea was enough to produce hypoxia at speeds greater than 140 r.p.m., as evidenced by oral cyanosis. Concurrently, the elevated hydrostatic pressures were sufficient to produce hemorrhage in the extremities. A tachycardia or bradycardia may occur, depending on the location of the center of rotation. In general, pathology is less when the center of rotation is at the heart than when located at the more caudad positions, but circulation is less impaired as the center is moved caudad. (Authors' abstract)

2700
Edwards, W.
AUTOKINETIC MOVEMENT OF VERY LARGE STIMULI. – Jour. Exper. Psychol., 48 (6): 493-495. Dec. 1954.
DLC (BF1.J6, v. 48)

The subjects observed the autokinetic movement of very large patterns of dots. The maximum visual angle involved was about 60°. All subjects saw movement on all trials. A wide variety of different kinds of movement was seen. When very rigid criteria for autokinetic movement were applied, all subjects still saw autokinetic movement on one or more stimuli, and all stimuli were seen as autokinetically moving. It is concluded that visual patterns of any extent may be seen as autokinetically moving. It is suggested that perhaps the ordinary visual world is stable because it contains much more information than visual worlds used in autokinetic movement experiments. (Author's summary)

2701
Egmond, A. A. J. van, 1952
J. J. Groen, and L. B. W. Jongkees
THE FUNCTION OF THE VESTIBULAR ORGAN. — Practica oto-rhino-laryngologica (Basel), 14 (Suppl. 2), 109 p. 1952. In English. DNLM

A subjective summary is presented of the function and reactions of the human vestibular organ, as they have been established from the works of others and during the course of the authors' own investigations. Consideration is given to physiological stimuli (angular and linear acceleration); to the mechanisms for the perception of the stimuli; to methods for investigating the system of semicircular canals (thermal, turning-chair, stability of man, measuring accelerations in walking man, the physiological turning of the head, tilting reactions, reactions of the canals to sound, consequences of total or partial destruction of the labyrinth); to angular acceleration perception thresholds; to the action of, and sensations originating from the otoliths; and to methods of investigating the otolithic organs (jump and free-fall, tonic reactions of gravitation, centrifugal force, non-uniform accelerations, and otolithic reactions to sound).

2702
Eiseley, L. C. 1953
IS MAN ALONE IN SPACE? — Scient.

American, 189 (1): 80-82; 84; 86. July 1953. DLC (T1.S5, v. 189)

In the light of evolution, ecology, and age and destiny of the universe, an answer to the ancient question as to whether or not another genus Homo has arisen on a planet similar to the Earth is speculated upon.

2703
Elam, J. O.,
and E. S. Brown
DETECTION OF HYPOXEMIA DURING INTRATHORACIC AND CARDIAC SURGERY: AN EVALUATION OF THE TWO-CHANNEL OXIMETER AND THE HYPOXIA WARNING DEVICE IN ANESTHETIZED PATIENTS. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract AF 18(600)-108); issued by School of Aviation Medicine, Randolph Field, Tex. March 1954. 18 p. (Project no. 21-1201-0005, Report no. 1). AD 31 132 PB 114194

Routine use of a two-channel oximeter (measuring the oxygen saturation in the pinna of the ear) during intrathoracic surgical procedures revealed a relatively high incidence of hypoxemia. Oxygen saturation below 60% for more than 5 minutes appeared to predispose the myocardium to subsequent failure when changes in hemodynamics were precipitated by manipulation of the heart, its valves, or major vessels. Clinical evidence of central nervous system sequelae was not observed in the survivors of hypoxemia, although oxygen saturations below 60% persisted in one individual for 11 minutes. Anesthetic techniques utilizing inspired mixtures containing more than 70% oxygen reduce markedly the incidence of hypoxemia provided ventilation is not neglected. A one-color oximeter, the hypoxia warning device (HWD), was investigated for clinical use since the two-channel oximeter in a reliable form is too complicated. The HWD was found useful in indicating relative changes in oxygen saturation, but changes in ear blood volume resulting from alterations in circulatory status prevent reliance on the calibration of this device. (AD abstract)

2704
Elam, J. O.,
E. S. Brown, and J. D. Elder
A MECHANICAL VENTILATION ANALOGUE. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract AF 18(600)-108); issued by School of Aviation Medicine, Randolph Field, Tex. Unnumbered Report, May 1954. 9 p. AD 54 630 PB 115718

A mechano-pneumatic system was designed and evaluated; the system provides for regulation of tidal volume, cycling rate, residual lung volume, dead space, CO_2 production rate, and for variations in respiratory flow pattern. Monitoring the expired CO_2 concentration of the analogue permits adjustment of one or more variables to produce an alveolar pCO_2 value in the range observed in anesthetized patients. In a limited series of postoperative patients, the CO_2 production rate exceeded the basal rate in patients having some degree of respiratory acidosis. A CO_2 production rate of 240 cc./min. was employed in the operation of the analogue for studies of CO_2 absorption. Application of the ventilation analogue to the study of CO_2 absorption revealed a leak of the mushroom valves in the majority of circle filters which were in clinical use. The ventilation analogue affords advantages for study of the characteristics of different breathing circuits under identical controlled conditions. The unit may be employed to demonstrate the changes patients would exhibit in alveolar pCO_2 when subjected to hypo- and hyper-ventilation, airway obstruction, apnea, etc. (AD abstract, modified)

2705
Ellis, B. C. 1953
PLASMA AND TOTAL BLOOD VOLUME ESTIMATIONS BY THE T1824 — HAEMATOCRIT METHOD: THE NORMAL VALUES OF THE WIT-WATERSRAND - (ALTITUDE 5,740

FEET). — South African Jour. Med. Sci. (Johannesburg), 18 (2): 45-56. Sept. 1953. DLC (R98.S6, v. 18)

A modification is described for the T1824 method of determining the plasma volume in man, using the Evelyn macro-colorimeter at the 6-ml. aperture. The accuracy of the photo-electric method is increased by a gravimetric technique which involves the weight of dye solution administered. In vitro experiments show the mean error of this technique to be 2.1 per cent with an observed maximum deviation of 2.8 per cent. The plasma volume for 20 healthy South African European males living on the Witwatersrand at 5,740 ft. above sea-level was 39.3 ± 0.649 ml./kg., the total blood volume was 75.1 ± 1.21 ml./kg. and the red cell volume was 35.8 ± 0.816 ml./kg. Comparing these results with those of American and English sea-level workers it is shown that at this altitude (5,740 ft.): (a) the plasma volume is reduced by about 13 per cent, (b) the total blood volume is reduced by about 8 per cent, and (c) there is no significant difference in the red cell volumes. It is suggested that the cause of the reduced plasma volume is the lower barometric pressure at this altitude. Further, it is felt that this plasma volume reduction may increase the oxygen carrying capacity per unit volume of the blood sufficiently to offset the existing relative anoxia at this altitude, and thus produce no observed increase in the volume of circulating red cells. (Author's summary)

2706
Ellis, B. C.
A COMPARISON OF THE T1824 BLOOD VOLUME AT SEA-LEVEL AND AN ALTITUDE OF 5,740 FEET IN NORMAL SOUTH AFRICAN EUROPEAN MALES. — South African Jour. Med. Sci. (Johannesburg), 19 (1-2): 11-14. June 1954. DLC (R98.S6, v. 19)

The results of single blood volume estimations on 20 healthy South African European males who were living at sea-level are presented. The plasma volume was 43.5 ± 0.77 ml./kg., the red cell volume 36.6 ± 0.82 ml./kg. and the total blood volume 80.1 ± 1.42 ml/kg. These values fall within the normal range given for sea-level values elsewhere. When the results of the Cape Town (sea-level) and Johannesburg (5,740 feet) series are compared, the differences previously suspected by the author (cf. item no. 2705) are confirmed. Comparison of the ml./kg. values shows that at Johannesburg the plasma volume is reduced by 9.7%, the total blood volume is lower by 6.2% and the red cell volume is essentially the same as at Cape Town. The altitude difference appears to be responsible for these changes, and it is suggested that the hemoconcentration at a moderate altitude corrects the associated relative anoxia, and as a result no increase in the red cell mass occurs. (Author's summary)

2707
Ellis, F. P. 1952
HOT-CLIMATE FATIGUE IN THE ROYAL NAVY: A REVIEW OF LAY OPINION. — Lancet (London), 263 (6733): 527-531. Sept. 13, 1952. DLC (R31.L3, v. 263)

Hot-climate fatigue is typified by lethargy, mental retardation, reduced powers of concentration and sense of responsibility, irritability, and mild changes in personality and forgetfulness, which are associated often with excessive sweating, unsatisfactory sleep, skin diseases, loss of weight and appetite, and ill-defined digestive disorders. This syndrome develops when men live and work at levels of warmth which result in the presence of unevaporated sweat on the skin and in the clothing. The majority of men exposed to these conditions suffer in one way or another after a time, but the symptoms are relieved by resumption of life in a cooler climate. On the basis of available evidence, the author suggests that hot-climate fatigue does not present many serious problems.

2708
Ellis, F. P. 1953
TROPICAL FATIGUE. — In: Floyd, W. F. and A. T. Welford, ed. Symposium

on Fatigue, p. 21-39. London: H. K. Lewis and Co., Ltd., 1953. DNLM

The tropical fatigue syndrome is discussed. Interacting factors, which facilitate its development and defy solution by purely physiological or psychological means, are discussed. It is emphasized, that an individual with an unstable emotional background or a warmth-sensitive person is more likely to succumb to lethargy, reduced concentration, lowered efficiency, an impaired sense of responsibility, memory defects, and personality changes, which are all symptomatic of tropical fatigue. Remedies suggested involve a change of climate.

2709
Ellis, F. P.,
H. M. Ferres, and A. R. Lind
THE EFFECT OF WATER INTAKE ON SWEAT PRODUCTION IN HOT ENVIRONMENTS [Abstract]. — Jour. Physiol. (London), 125 (2): 61P-62P. Aug. 27, 1954. DLC(QP1.J75, v. 125)

The effect of water intake on sweat output was investigated in 12 acclimatized young men in Singapore. Sweat losses, rectal temperatures, and pulse rates were measured throughout the experiment. The subjects worked at a dry-bulb temperature of 100°F. (37.8°C.), a wet-bulb temperature of 94°F. (34.4°C.) and an air speed of 150 ft./min., for a period of 4 hr. on 6 consecutive days. The work routine consisted of step climbing for 10 min. and resting for 20 min. in each half-hour. There were three levels of water intake — 550, 700, and 850 ml./hr. During the first hour, the level of water intake did not affect the amount of sweat produced, and no effect on rectal temperature was noted. During successive hours, a higher water intake produced increased sweat losses and slowed the rise of rectal temperature. In no case did the intake exceed the sweat loss, but deficiencies of 460-1358 g. resulted from the experiments.

2710
Ellis, F. P.,
H. M. Ferres, A. R. Lind, and P. S. B. Newling
THE UPPER TOLERABLE LEVELS OF WARMTH FOR ACCLIMATIZED EUROPEAN MEN WORKING IN THE TROPICS [Abstract]. — Jour. Physiol. (London), 125 (2): 55P-56P. Aug. 27, 1954. DLC(QP1.J75, v. 125)

A nomogram based on a predicted 4-hour sweat loss of 4.5 liters as the upper limit of endurance for fit, acclimatized young men in England, has been devised to calculate the physiological effects of hot environments over a wide range of conditions. Points corresponding to the predicted 4-hour sweat loss for different levels of dry- and wet-bulb temperatures are plotted for men wearing overalls and working for 4 hr. at a mean gross energy cost of 111 kcal./m^2./hr. with a mean air movement of 150 ft./min., and with the mean radiant temperature of the surroundings almost the same as the air temperature. In Singapore, 11 fit young men, acclimatized to the Tropics, who had undergone a further 14 consecutive days artificial acclimatization, carried out the same work under the same conditions of air movement and clothing. Points are plotted to show the dry- and wet-bulb temperature combinations at which 0, 1-3, or more than 5 of them were incapacitated before the experiment ended. The close agreement between the prediction for young men in England and the experimental observations in Singapore under similar working conditions, suggests that the upper tolerable levels of warmth in the Tropics and in England are similar, provided they are trained to carry out daily work at high temperatures. Small variations in wet-bulb temperature or in air movement have a considerable effect upon men's performance at these critical levels of warmth. (Quoted in part)

2711
El'piner, I. E.
[BIOLOGICAL EFFECTS OF ULTRASONIC WAVES] O biologicheskom deĭstvii ul'trazvukovykh voln. — Zhurnal obshcheĭ biologii (Moskva), 15 (1): 18. Jan.-Feb. 1954. In Russian.
DLC (QH301.Z55, v. 15)

An extensive review of the literature on the subject which points to the many varied biological effects of ultrasonic waves is presented. The effects of ultrasonic waves cannot be reduced to sudden disruption of cells and disorganization of cellular structure. Evidence has been found to the effect that considerable intracellular disruption occurs in instances where external cell structures remain undisturbed. Analysis of evidence presented in the literature points to the fact that the biological activity of ultrasonic waves was apparently the result of mechanical as well as electro-chemical processes induced by a physical agent. The determination of the mechanism of action of ultrasonic waves proves a more complex task. It is complicated by the fact that a considerable part of the ultrasonic energy is absorbed by the tissues transformed into heat. It appears possible that the effect of ultrasonic waves on the macroorganism manifests the specific characteristics of ultrasonic wave activity in the form of specific mechanical and chemical processes. The review also indicated clearly that the application of ultrasonic waves may prove of basic importance to all phases of modern biology. (Author's summary, modified)

2712
Eriksen, C. W.,
and H. W. Hake
ABSOLUTE JUDGMENTS AS A FUNCTION OF THE STIMULUS RANGE AND THE NUMBER OF STIMULUS AND RESPONSE CATEGORIES. — Johns Hopkins Univ. Inst. for Cooperative Research, Baltimore, Md. (Contract AF 33(038)-22642); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-162, April 1954. iii+15 p. (RDO nos. 694-43 and 694-45). AD 38 145
PB 123939

Discrimination among different sized squares was studied when (1) the size of the squares varied from 2-42 mm.sq. and from 2-82 mm.sq.; (2) 5, 11 and 21 different sized squares were presented for judging; and (3) 5, 11 and 21 response categories were available for expressing judgments. The data were analyzed along the line of information theory with discrimination being measured in terms of transmitted information (I_t). In the statistical analysis two significant effects were obtained. The first of these pertained to the stimulus range. Increasing the range from 2-42 to 2-82 mm.sq. resulted in a reliable increase in I_t, but the magnitude of the increase was slight, averaging less than 0.2 bits. The second significant effect involved an interaction between the number of stimulus and response categories. It was found that discrimination as measured by I_t remained constant as the number of stimulus and response categories was increased, provided the number of response categories equaled or exceeded the number of stimulus categories. (From the authors' summary)

2713
Eriksen, C. W.
MULTIDIMENSIONAL STIMULUS DIFFERENCES AND ACCURACY OF DISCRIMINATION. — Johns Hopkins Univ. [Inst. for Cooperative Research], Baltimore, Md. (Contract AF 33(038)-22642); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-165, June 1954. iv + 11 p. (RDO nos. 694-43 and 694-45). AD-50 076
UNCLASSIFIED

The present report is concerned with the effect of visual stimulus variation in several dimensions simultaneously upon the accuracy of discrimination in absolute judgment. The

dimensions were size, hue and brightness The discrimination measures for these dimensions were obtained separately and were compared with discrimination measures obtained by compounding these dimensions in various ways. Discriminability was better for the multidimensional series of stimuli than for any of the compounded dimensions used alone. It was further shown that the discrimination accuracy for a compounded or multidimentional series can be predicted if the discrimination accuracy of the separate dimensions is known. This prediction is based on the assumption that the accuracy of discrimination on the several dimensions is independent when simultaneously judged. (Author's abstract)

2714
Eriksen, C. W.
PARTITIONING AND SATURATION OF THE PERCEPTUAL FIELD AND EFFICIENCY OF VISUAL SEARCH. — Johns Hopkins Univ. Inst. for Cooperative Research, Baltimore, Md. (Contract AF 33(038)-22642); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio, WADC Technical Report no. 54-161, April 1954. iii+11 p. (RDO no. 694-43 and 694-45). AD 40 730 PB 119256

An experiment was made to determine the effect of saturation, partitioning, and search area upon visual-search time. Speed of visual search, as measured by the time it took a subject to locate a constant number of signals in a display, was determined (1) when the number of irrelevant signals was varied from 10 to 70, and (2) when the number of partitions of the display was varied by the use of grid lines. Grid lines were used to partition the display into a 9 x 9, a 13 x 13, and a 16 x 16 matrix. The results show that search time increases both when the number of irrelevant signals is increased and when the number of partitions is increased. An explanation is advanced for these effects in terms of the number of foveal fixations required for signal identification and the use that observers make of grid lines in their plan of search. (AD abstract)

2715
Ermakov, N. V.
[AN AUTOMATIC METHOD FOR THE REGISTRATION OF THE ELIMINATION OF URINE BY ANIMALS IN COMPLETE ISOLATION] Metod avtomaticheskoĭ registratsii mocheotdeleniia u zhivotnykh v usloviiakh ikh polnoĭ izoliatsii. — Fiziologicheskiĭ zhurnal S.S.S.R. (Leningrad), 40 (4): 501-503. 1954. In Russian.
DLC (QP1.F57, v. 40)

The ureter of a dog (or other animal) is brought to the surface of the skin by a special Pavlovian operation, and a small glass funnel is firmly attached at the point of the urine outflow. With the aid of an electrical recording apparatus, which is supplied with a specially designed silver electrode, reflex inhibitions of the urinary elimination are automatically recorded as shown by a diagram. The volume of eliminated urine is recorded by several platinum electrodes placed inside of a urine collecting cylinder at levels representing 5 ml. The time intervals, the urine volume, and the reflex inhibition reactions are recorded kymographically.

2716
Estes, E. H.
TILT TABLE RESPONSE AND ITS RELATION TO "G" TOLERANCE. — Naval School of Aviation Medicine, Pensacola, Fla. March 22, 1954. 5+15 p. (Project Report no. NM 001 059.30.03). AD 35 223 UNCLASSIFIED

A low to moderate correlation has been shown between the following measurements and g tolerance in a group of 50 men: a) change in pulse rate with tilt, both immediately and over a period of time, b) change in the magnitude of the frontal plane ventricular gradient with tilt, and c) change in the frontal plane QRS-T angle with tilt. The control level of systolic blood pressure was

also found to have a similar degree of relationship with the unconscious level of g tolerance. These various measurements were also found to correlate substantially with one another. The degree of correlation found between the various measurements and g tolerance was not sufficient to be of predictive value in a given individual. (Author's summary)

2717
Eugster, J. 1953
[THE BIOLOGICAL AND CHEMICAL EFFECTS OF COSMIC RADIATION] Die kosmische Strahlung, ihre biologische und chemische Wirkung. — Bulletin der schweizerischen Akademie der medizinischen Wissenschaften (Basel), 9 (2): 114-120. June 1953. In German, with English summary (p. 119-120). DNLM

The biologically active components of cosmic rays are discussed, and their physical characteristics and occurrence at high altitudes are described. Instead of the usual photographic plates, a colorimetric method utilizing a vital stain is recommended for the detection of cosmic rays, and the apparatus and materials needed for such high altitude studies are described. The author advocates further studies of the influence of cosmic rays on enzymes in living tissue, since enzyme activity has been shown to be disturbed by very small doses of cosmic radiation. (From the author's summary)

2718
Euler, U. S. von,
and U. Lundberg
EFFECT OF FLYING ON THE EPINEPHRINE EXCRETION IN AIR FORCE PERSONNEL. — Jour. Applied Physiol., 6 (9): 551-555. March 1954. DLC (QP1.J72, v. 6)

The epinephrine output in urine was estimated in air force personnel during night rest (sleep), during normal ground activity and during flights. The epinephrine output during ground activity (6.7 ± 0.98 mμg/min.) and during flight (24 ± 2.7) in unexperienced, air transported privates was significantly different ($P = < 0.001$). In a group of pilots similar differences in epinephrine output during flight and during ground activity were observed. A significant difference was also noted for norepinephrine in the latter group. During night rest the epinephrine output was 2.2 ± 0.65 and 5.1 ± 0.66 mμg/min., respectively, in two groups with and without flights as passengers the following day. The former figure was significantly lower than that during ordinary ground activity. (Authors' summary)

2719
Everstål, S.
[RELUCTANT (APPREHENSIVE) ATTITUDE TOWARD FLYING DURING BASIC FLIGHT TRAINING] Flygolust (flygrädsla) hos elever under grundläggande flygutbildning. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 3 (3): 10. 1954. In Swedish. DNLM

The flight instructor's role in relieving fear of flying in trainees is discussed. At times, offering reassurance and support will help in correcting these attitudes. The development of the fear-of-flying complex in the pilot is described, with emphasis on the importance of first experiences in solo flight and on flight accidents involving other students.

2720
Evard, E.
[MEDICAL COMMENTARY ON FATIGUE IN THE FIGHTER PILOT] Commentaire médical sur la fatigue du pilote de chasse. — Annales Belges de médecine militaire (Liège), 107 (6-7): 118-119. June-July 1954. In French. DNLM

Mental fatigue (emotional stress) in fighter pilots is briefly discussed, including its neuro-vegetative mechanisms, pathogenesis and symptomatology. Its principal symptoms are adaptation syndrome: (1) period of alarm (tachycardia, nervous depression, hypoglycemia); (2) period of resistance

(hyperglycemia and hyperchloremia), and (3) period of exhaustion (reduction of glucose, chloride, and blood pressure). These symptoms provide the means for clinical tests in detection and evaluation of pilot fatigue.

2721
Evrard, E.
[THE PROBLEM OF AGE LIMIT OF FIGHTER PILOTS] Le problème de la limite d'âge des pilotes de chasse. — Médecine aéronautique (Paris), 9 (1): 71-74. 1954. In French.
DLC (TL555.M394, v. 9)

Also published in: Annales Belges de médecine militaire (Liège), 107 (6-7): 112-115. June-July 1954. In French.

In the Belgian Air Force the main reasons for the terminations of flight duty of fighter pilots are anxiety and other psychological disturbances, reduction of visual acuity, deficiencies of the inner and middle ear, pulmonary and cardiovascular conditions, and digestive and renal disorders. We have the affirmation of many pilots that the handling of jet planes is simpler and easier than that of piston-engine planes. It is premature to set a certain age limit considering the rapid advance in aviation techniques since the physiological age of the pilot may be quite different from his chronological age. It therefore appears best to adopt a flexible age policy and to consider each case not with preconceived notions but on its own merit under proper consideration of all physiological and psychological factors.

2722
Falet, R.
[A CONTRIBUTION TO THE STUDY OF THE DONAGGIO REACTION: A DESCRIPTION OF A MICRO-METHOD] Contribution à l'étude de la réaction de Donaggio; description d'une micro-méthode. — Médecine aéronautique (Paris), 9 (2): 153-161. 1954. In French.
DLC (TL555.M394, v. 9)

The work of a number of investigators concerned with the mechanism of the Donaggio reaction (precipitation of thionine in the presence of ammonium molybdate in the urine) is reviewed. A fairly simple micro-method is described which can be manipulated with facility and speed to determine the degree of fatigue. The method lends itself well for determining fatigue in flyers.

2723
Farhi, L E ,
and H. Rahn
CHANGES IN O_2 and CO_2 STORES OF THE BODY DURING THE "UNSTEADY STATE." — Federation Proceedings, 13 (1^I): 42. 1954.
DLC (QH301.F37, v. 13)

The "steady state" may be defined as that state during which there is no change in O_2 and CO_2 stores of the body. The respiratory gas exchange is then equal to the metabolic gas exchange in the tissues. Any alteration in cardiac output, alveolar ventilation, or inspired gas composition, alone or in combination, will alter these stores, producing temporarily an "unsteady state," during which the ventilatory O_2 and CO_2 exchange is equal to the metabolic gas exchange plus or minus the quantity of gas which is being removed from or added to the stores. The O_2 stores are small, largely confined to the blood and quickly altered. The bulk of the CO_2 stores is in the tissues (excluding the bone) which contain about 3 times as much as the total blood. They are adjusted slowly and a new steady state is reached sooner for O_2 than for CO_2. A 4-parameter chart is presented from which the overall changes in body stores can be calculated for any changes in arterial and venous gas tensions. (From the authors' summary)

2724
Farnsworth, D.
AN INTRODUCTION TO THE PRINCIPLES OF COLOR DEFICIENCY. — Naval Medical Research Lab., New

London, Conn. Report No. 254 (vol. 13, no. 15), Sept. 8, 1954. iii + 24 p. (Project Report no. NM 003 041.60.01). AD 48 969 UNCLASSIFIED

This report is a simplified introduction to the principles of color defectiveness. The color confusions made by color defectives are shown by means of an adjustable diagram. The characteristics of color defective vision, their systematic basis and the classification of types are explained by reference to data derived from special laboratory tests. Explanation is made of the construction and operation of common tests for color defectiveness and the selection of color codes. (Author's summary)

2725
Fay, J. C. 1953
CEREBROSPINAL FLUID ADJUSTMENT TO CHANGE IN BODY POSITION. [Abstract] — Anat. Record, 115 (2): 305-306. Feb. 1953. DLC (QL801.A45, v. 115)

In cats and monkeys tilted to the head-down position, the cerebrospinal fluid pressure in the cisterna magna first rose then gradually returned toward normal. On assuming the horizontal position after the head-down tilting, the pressure fell below normal and then gradually returned to normal. The reverse occurred when the animals were tilted to the head-up position and returned to the horizontal position.

2726
Fay, J. [C.], and P. Settlage 1953
CEREBROSPINAL FLUID PRESSURE ADJUSTMENT TO CHANGE IN BODY POSITION. — Neurology, 3, (12): 916-921. Dec. 1953. DLC (RC321.A47, v. 3)

The effect of prolonged periods of change in inclination of the body axis upon cerebrospinal fluid pressure, as recorded in the cisterna magna, were studied. On tilting the animal (cat or monkey) to the head-down position, the cerebrospinal fluid pressure immediately rose and then gradually returned toward the normal. On returning to the horizontal position following the head-down period, the cerebrospinal fluid pressure fell below the original control level and gradually returned to the normal. The reverse effects were noted for the head-up and the succeeding horizontal positions. A mechanism for the adjustive process, involving the cerebrospinal fluid-venous pressure relationship, is suggested. A theoretical curve is presented for the lumbar pressures which would occur concomitantly with the observed cisternal pressure values. The lumbar pressure tends to deviate from a mean value as far as the cisternal pressure returns toward this value. (Authors' summary, modified)

2727
Fenn, W. O.
THE PRESSURE VOLUME DIAGRAM OF THE BREATHING MECHANISM. — In: (School Aviation Med.). Respiratory physiology in aviation, p. 19-27. Randolph Field, Tex. Sept. 1954. (Project no. 21-2301-0003). AD 179 UNCLASSIFIED

The pressure-volume diagram and the methods employed to attain the respiratory data expressed on it have been outlined in detail in a previous paper by the author (Amer. Jour. Med., 10 (1): 77-90. 1951). The pressure-volume diagram is based on three types of respiratory measurements: (1) maximum expiratory and inspiratory pressures at different lung volumes; (2) relaxation pressures at different lung volumes; and (3) vital capacities, tidal air, and inspiratory and expiratory reserves at different lung pressures. This paper presents a series of curves derived from measurements of subjects who were exposed to the following respiratory situations: (1) pressure breathing; (2) artificial respiration; (3) pneumothorax; and (4) breathing at altitude. In accordance with the experimental conditions, the respective diagrams show the boundaries of

tidal air regions, of maximum expiratory and inspiratory (vital) capacities, of residual air pressures, and of pulmonary blood pressures. The diagrams thus supply an effective means of evaluating the mechanical events of respiratory processes.

2728
Fenno, R. M.
MAN'S MILIEU IN SPACE: A SUMMARY OF THE PHYSIOLOGIC REQUIREMENTS OF MAN IN A SEALED CABIN. — Jour. Aviation Med., 25 (6): 612-622. 1954.
DLC (TL555.A1A4, v. 25)

A review is presented of the problems arising from the physiological requirements of man living in a sealed cabin in space. Data are given on cabin acclimatization based on the balloon ascensions of Auguste Piccard. The physiological requirements of man in a sealed cabin are discussed under the following headings: (1) oxygen (problem of the weight of oxygen container); (2) carbon dioxide (methods of CO_2 removal including the use of a photosynthetic gas exchange system); (3) temperature (problem is essentially one of reflection-absorption of radiant heat); (4) pressure (most desirable atmospheric pressure of the internal hull would be equivalent to 30,000 feet if the cabin air were 100% oxygen); (5) noxious gases (methods of removing under research); (6) noise (should be below 70 db. for prevention of acoustic trauma); (7) radiation (permissible dosages of cosmic radiation will need to be determined). The author recommends that pressurization of high-altitude aircraft cabins be deemphasized in favor of the sealed-cabin approach.

2729
Ferrari, C.
[AUDIOMETRIC MODIFICATIONS IN HYPEROXIA] Modificazioni audiometriche in iperossia. — Archivi italiani di laringologia (Napoli), 62 (1): 52-53. Jan.-Feb. 1954. In Italian. DNLM

A brief review is presented of experiments dealing with the effects of hypoxia on hearing functions. Moderate and inconsistent modifications in hearing were demonstrated.

2730
Ferrari, E.,
and L. Amantea
[ASPECTS OF THE ELECTRICAL ACTIVITY OF THE CEREBRAL CORTEX IN DOGS SUBJECTED TO INDUCED HYPOTHERMIA] Aspetti dell' attività elettrica della corteccia cerebrale di cani sottoposti ad ipotermia provocata. — Acta neurologica (Napoli), 9 (4): 513-519, July-Aug. 1954. In Italian. DNLM

Electroencephalographic recordings of the cerebrocortical activity in oxygenated, hypothermic dogs (14°-33°C.) showed convulsions. During rewarming, convulsions of the grande mal type were recorded. These manifestations appeared immediately after hyperoxygenation at temperatures of 23°-33°C. The authors note that the tendency for convulsion is greater at low temperatures and disappears at higher temperatures with an effect on central neuronal activity. In addition to the direct physical action of cold, there appears to be a complex biological modification induced by the convulsive changes during rewarming such as water-salt equilibrium problems and tissue hydrophilia.

2731
Ferrari, G.
[BAROMETRIC ALTIMETER ON BOARD] L'altimetro barometrico di bordo. — Rivista aeronautica (Roma), 30 (11): 1247-1258. Nov. 1954. In Italian.
DLC (TL504.R54, v. 30)

A modified airplane barometric altimeter is described and illustrated. Among the advantages of this altimeter are: (1) elimination of the millibar regulation scale, (2) easy and reliable reading of height, and judgment of height variations during day or night flight, and (3) direct and continuous reading of height levels. Barometric altimetry provides maximum operative

efficiency, reducing to a minimum pilot errors in regulation, interpretation and reading of the altimeter - errors that often cause fatal incidents.

2732
Ferres, H. M,
R. H. Fox, and A. R. Lind
INDIVIDUAL VARIATION IN ENERGY EXPENDITURE [Abstract]. — Jour. Physiol. (London), 123 (3): 74P-75P. March 29, 1954. DLC (QP1.J75, v. 123)

Measurements of the energy expended by four healthy, young acclimatized males were made in experiments which extended over a period of 1 month. The subjects were studied while sitting and while walking at six speeds on a treadmill, in a controlled climate of dry-bulb 32.2°C., wet-bulb 26.7°C., and air speed of 300 ft./min. One of the four subjects expended significantly less energy, both resting and walking, when compared with the other three. After subtracting the resting from walking energy-expenditure values, this subject expended approximately 19% less energy per kilogram body weight per mile walked. His lower energy expenditure was associated with a lower sweat rate and differences in other physiological responses, when compared with the rest of the subjects under the same experimental conditions of work rate and climatic stress. The occurrence of subject differences of such a magnitude during the performance of a standardized exercise emphasizes the importance of measuring the energy expended by each subject used in climatic physiology experiments, in addition to controlling the influence of the heat of metabolism by the adoption of a standardized work and rest routine. Acclimatized individuals exhibiting a similar economy of energy expenditure on standardized tasks would be expected to survive for a longer period and to exhibit less physiological strain in excessively hot environments; this might be of importance in the selection of personnel for certain special types of work involving the hazard of intolerably hot conditions. (Quoted in part)

2733
Fiedler, F. E.
INTERPERSONAL PERCEPTION AND SOCIOMETRIC STRUCTURE IN PREDICTION OF SMALL TEAM EFFECTIVENESS [Abstract] — Amer. Psychologist, 9 (8): 365. Aug. 1954.
DCL (BF1.A55, v. 9)

Two studies investigated the relation of the leader's interpersonal perception to the effectiveness of small military units. Fifty-three bomber crews were used as subjects for the exploratory study. Twenty-five army tank crews were used for the validation study. For both groups interpersonal perception was measured by Assumed Similarity Scores (ASo), which are obtained from a comparison of predictions the test subject makes for his most and for his least preferred co-workers on the sample personality test items. Sociometric ratings of crew members were obtained. In the Bomber crew group, significant relations were obtained between aircraft commander's ASo and Radar Bomb scores only in crews having certain sociometric structure, e.g., where aircraft commanders and keymen mutually chose each other. The validation study on army tank crews unequivocally supported the findings of the first study; e.g., where commander and keymen mutually chose each other, the commander's ASo correlated significantly with objective criteria. The discussion deals with practical implications to team assembly and with theoretical implications which led to a revised conception of sociometric structure in prediction of small team effectiveness. (Abstract, modified)

2734
Fleetwood, P. G.
MEDICAL SERVICE CORPS, U. S. AIR FORCE. — Military Surgeon, 115 (1): 16. July 1954.
DLC (RD1.A7, v. 115)

A brief review of the development and aims of the Medical Service Corps of the Air Force is presented.

2735
Fleishman, E. A.,
and W. E. Hempel
CHANGES IN FACTOR STRUCTURE OF A COMPLEX PSYCHOMOTOR TEST AS A FUNCTION OF PRACTICE. — Psychometrika, 19 (3): 239-252. Sept. 1954. DLC (BF1.P86, v. 19)

Scores obtained at eight different stages of practice on the Complex Coordination Test together with scores on 18 reference tests were subjected to a Thurstone Centroid Factor Analysis. Nine meaningful factors were identified in the experimental battery. The results indicated considerable, but systematic, changes in the factor structure of the Complex Coordination Test as practice on the task was continued. The test became less complex (factorially) as practice was continued. Moreover, there was a change in the nature of the factors contributing variance at early and later stages of practice. Implications of the findings are related to certain problems of learning theory, psychomotor test development, and criterion analysis. (Authors' summary)

2736
Fleishman, E. A.,
and W. E. Hempel
A FACTOR ANALYSIS OF DEXTERITY TESTS. — Personnel Psychol., 7 (1): 15-32. Spring 1954.
DLC (HF5549.A2P53, v. 7)

This study represents an explanatory investigation into the nature of factors contributing to manipulative performance. A battery of fifteen widely used printed and apparatus dexterity tests was administered to a sample of 400 basic airmen at Lackland Air Force Base. The scores were subjected to a factor analysis. The results present evidence against the concept of "manual dexterity" as a unitary ability. Five factors were identified to account for performance in the range of tasks investigated. These were named Finger Dexterity, Manual Dexterity, Wrist-finger Speed, Aiming, and Positioning. The results are discussed with respect to the factor composition of the individual tests, the utility of certain printed tests in measuring the factors identified, and possible test improvements. (Authors' summary)

2737
Fleishman, E. A.,
and W. E. Hempel
FACTORIAL ANALYSIS OF COMPLEX PSYCHOMOTOR PERFORMANCE. — Air Force Personnel and Training Research Center. Skill Components Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. AFPTRC-TR-54-12. April 1954. iii + 18 p. (Project no. 7703). AD 34 411 PB124632

A description is given of a factor analysis of the intercorrelations among certain variables selected from the correlation matrix published by Payne, R. B., 1952. The analysis appears to have split the factor previously called psychomotor coordination into a fine highly controlled movement factor and a more gross movement factor. Two separate spatial relations factors were isolated. One is identified with the ability to interpret spatial characteristics of the stimulus, while the other is more identified with directional discrimination of movement patterns. The factor previously called psychomotor precision was more adequately described as manual dexterity. A factor called integration was identified as common to both certain printed and apparatus tests, while a factor called rate control was restricted to certain apparatus tests and a perceptual speed factor was restricted to printed tests. The separation of a visualization factor from spatial relations was confirmed. In general, the conclusion is that some of the factors defined in psychomotor

tests may also be sampled by printed tests. (AD abstract)

2738
Fleishman, E. A.

A FACTORIAL STUDY OF PSYCHOMOTOR ABILITIES. — Air Force Personnel and Training Research Center. Skill Components Research Lab., Lackland Air Force Base, Tex. Research Bulletin AFPTRC-TR-54-15, May 1954. iv + 43 p. (Project no. 7703, Task no. 77084). AD 34 407

PB 124633

Also published as: Dimensional analysis of psychomotor abilities. Jour. Exper. Psychol., 48 (6): 437-454. Dec. 1954. DLC (BF1.J6, v. 48)

A large number of apparatus and printed psychomotor tests were selected or specifically designed to measure certain ability categories hypothesized to exist from the results of previous research in this area. After extensive pretesting, the tests were assembled into a battery and administered to 400 subjects. The correlations among scores on these tests were then subjected to a Thurstone centroid factor analysis. The results of the study appear to confirm the existence of the following relatively independent factors in psychomotor skill: (1) Wrist-Finger Speed, (2) Finger Dexterity, (3) Rate of Arm Movement, (4) Manual Dexerity, (5) Steadiness, (6) Reaction Time, (7) Aiming, (8) Psychomotor Coordination, (9) Postural Discrimination, and (10) Spatial Relations. Two additional factors were isolated but their interpretation or significance remains doubtful. The results are discussed with respect to the factor composition of individual tests, the utility of certain printed tests designed to reproduce apparatus test variances, and the contribution of these factors to certain kinds of more complex psychomotor performance. Additional studies are exploring the organization of abilities in other kinds of psychomotor tasks, especially of more complex varieties. (From the author's summary)

2739
Fletcher, D. E.

HUMAN ENGINEERING INVESTIGATIONS OF AIRCRAFT COCKPIT VISUAL DISPLAYS. IV. EVALUATION OF THE DISPLAY OF THE KEARFOTT DIRECTIONAL HORIZON 6N-1AM. — Naval Air Material Center. Aero Medical Equipment Lab., Philadelphia, Pa. Report no. XG-T-204, March 5, 1954. 9 p + 4 plates. (Project TED no. NAM AE-7047, Part 4). AD 144 009

UNCLASSIFIED

The brightness, brightness contrast, attitude indication, and directional indication of the Kearfott Directional Horizon 6N-1AM have been evaluated with respect to general human engineering principles. The "sky" sphere and the masking ring are too bright. As is, they would be distracting and would interfere with dark adaptation maintenance. The level of reflectances in the "terrain" is so low as to provide a poor contrast background for black objects that must be visible on it. Its reflectance is open to adjustment to provide the best overall contrast in the display, given the limits of the highest and lowest contrasts of the display, the "sky" and objects, respectively. The pictured real terrain presents some perceptual contradictions in the display that might produce reading errors. In reading attitude, the horizon position is ambiguous and, therefore, can decrease the sensitivity of reading small pitch values. The form of the "aircraft" presents problems in reading attitude in that it is not adequately visible under all conditions, it can obscure other objects on the display, and it tends to hide in the "terrain". Readings of roll become less sensitive as pitch increases in value. The present form of the directional indication is adequate. (Author's conclusions)

2740
Fleuriot, M.

[NOTE ON THE ROLE OF TOBACCO IN CARBON MONOXIDE POISONING]

Note sur le rôle du tabac dans l'intoxication par l'oxyde de carbone. — Archives des maladies professionelles de médecine du travail et de sécurité sociale (Paris), 15 (3): 229-233. 1954. In French. DNLM

Subjects exposed to probable carbon monoxide intoxication, including boiler workers, alcoholics, and smokers, were studied. The mean level of carbon monoxide in the blood measured in the first case was found to be 4.60 cm.^{3}/l. In the case of alcoholics, a similar level of 4.56 cm.^{3}/l was observed, while in heavy smokers the level of carbon monoxide rose to 10 cm.^{3}/l. It was found that in each case in which the level of carbon monoxide became greater than 8 cm.^{3}/l., the red blood cell count rose from four million to 4.6 million, while the white cell count remained normal.

2741
Floyd, W. F., 1953
and A. T Welford (editors)
SYMPOSIUM ON FATIGUE. London: H. K. Lewis and Co., Ltd., 1953. 196 p. DNLM

This symposium, held at the College of Aeronautics, Cranfield, England, March 24-27, 1952, under the auspices of the Ergonomics Research Society, brings together contributions dealing with the many-sided and complex problems of fatigue. The physiological nature of fatigue, although readily demonstrated after heavy muscular work under adverse environmental conditions, is more elusive with light work in favorable environment. Psychologically, fatigue is studied by observing changes in behavior of the whole organism relating performance to stimulus, or movements to visual or auditory display. The importance of thermal factors, oxygen debt, and boredom in producing fatigue is discussed. — Pertinent articles are abstracted separately as items no. 2463, 2695, 2708, 2741, and 3449.

2742
Földi, M.,
A. G. B. Kovách, and E. Koltay
[THE EFFECT OF HYPOXEMIA OF THE ISOLATED HEAD ON Na ELIMINATION] Wirkung von isolierter Kopfhypoxämie auf die Na-Ausscheidung [Abstract] — Acta physiologica Academiae scientiarum hungaricae (Budapest), 5 (Supplement): 66-67. 1954. In German.
DLC (QP1.M333, v. 5)

It is generally known that during systemic hypoxemia the elimination of sodium and water decreases. With regard to glomerular filtration in systemic hypoxemia, reports are contradictory. If venous blood is circulated through the kidneys, an increase in water and sodium elimination is observed. In the series of experiments reported here, hypoxemia of the head was created by separating the cephalic circulation from the systemic, and maintaining the former by circulating blood with a controllable O_2 content by means of a pump. Conclusions presented were made on the basis of findings from 18 experiments. It was concluded that, as a result of hypoxemia of the head, sodium elimination through the kidneys decreases; this decrease failed to take place only once. In most cases, the decrease in sodium filtration parallelled the decrease in sodium elimination. In three cases decreased sodium elimination occurred without any changes in glomerular clearance. On the basis of these results, it may be concluded that hypoxia of the central nervous system or the stimulation receptors sensitive to hypoxia may cause sodium retention through reflex action. It is possible that this mechanism is implicated in the phenomena of cardiac edema and sodium retention during pneumonia. (Translated in full and modified)

2743
Folkow, B.,
and J. R. Pappenheimer
PROPORTION OF THE RESPIRATORY

DEAD SPACE CONTAINED WITHIN THE LUNGS. — Federation Proceedings, 13 (1[I]): 45-46. 1954.
DLC (QH301.F37, v. 13)

The respiratory dead space may be considered to consist of 2 principal components. The first component is represented anatomically by the respiratory passages leading to all alveoli which are ventilated. The second component may be considered to consist of alveoli which are ventilated but poorly perfused. This component of the dead space is in parallel with the functional alveoli. We have developed methods to measure the volume of each component in anesthetized cats. Approximately 25% of the series dead space is normally located in the bronchial tree below the bifurcation of the trachea. This was determined by measuring the total series dead space before and after removal of 1 lung. The mean volume of the series dead space is relatively independent of the tidal volume but is appreciably affected by changes in mean pressure difference across the lungs. The parallel dead space is negligible under normal conditions. After tying 1 pulmonary artery, however, it becomes equal to about 1/2 the tidal volume and varies in proportion to the difference between tidal volume and series dead space. Both components of the respiratory dead space can be estimated from relatively few respiratory quantities. (From the authors' abstract)

2744
Forgays, D. C.
GROUP INTACTNESS AND THE PREDICTION OF COMBAT PERFORMANCE OF BOMBER CREWS FROM TRAINING MEASURES [Abstract] — Amer. Psychologist, 9 (8): 370. Aug. 1954. DLC (BF1.A55, v. 9)

This study attempts to assess the differential prediction of combat performance from training measures of bomber crews representing two levels of intactness during the intervening period. Approximately 100 Air Force medium bomber crews, flying combat missions with the Far Eastern Air Forces in the Korean conflict, were employed as subjects. The two levels of intactness used were as follows: (a) a crew is eliminated if it has had an aircraft commander change, more than two other officer changes, or more than three changes of any sort; and (b) a crew is eliminated if more than 50% of its original members have been changed. Predicting variables included the following scores achieved during training: performance ratings, bombing and navigational accuracy, and sociometric ratings. Criterion variables were: combat performance ratings, combat bombing and navigational accuracy scores, and peer rating obtained in the combat situation. The obtained results indicate that the importance of integrity of group membership for future prediction of group performance from earlier performance is specific to the nature of the predicting variables. (Quoted in part)

2745
Forster, R. E.,
W. A. Briscoe, and D. V. Bates
PULMONARY DIFFUSING CAPACITY AT DIFFERENT LUNG VOLUMES. — Federation Proceedings, 13 (1[I]): 46. 1954. DLC (QH301.F37, v. 13)

Relative changes in pulmonary CO diffusing capacity (D_{CO}) with changes in total lung volume were estimated by 2 independent methods. D_{CO} was determined by the modified Krogh breath-holding-technique at 3 lung volumes—near-residual volume, functional residual capacity, and near-maximal lung volume. Because the expired alveolar CO concentration does not decrease exponentially with time of breathholding, for purposes of comparison an average D_{CO} was computed for the first 10-sec. interval. In the second method the subject inspired a low concentration of CO (about 0.1%) from the bag and expired through an infrared CO meter into the box of a closed Donald-Christie type of

apparatus. A pressure transducer connected to the box recorded tidal volumes. The output of the CO meter gave a continuous record of end expiratory CO concentration. The subject maintained a constant respiratory rate and depth at the 3 lung volumes for periods long enough to produce a constant end-expiratory CO concentration. Any change in D_{CO} should have been reflected in a change in end-expiratory CO concentration. Preliminary data on 2 normal subjects from both methods indicate that D_{CO} does not increase appreciably with increasing lung volume. (From the authors' summary)

2746
Forteza Bover, J. 1953
[OUTLINE OF MEDICAL FLIGHT SERVICE IN SPAIN (S.A.S.)] Esbozo de un socorro aéreo sanitario en España. (S.A.S.). — Clinica y Laboratorio (Zaragoza), 55 (327): 433-442. June 1953. In Spanish. DNLM

A general discussion is presented on the function and organization of medical air services in Spain. Requirements are described for aircraft used in the evacuation, rescue, or transportation of the wounded and the sick, with reference to cabin layout, temperature regulation, ventilation, disinfection, and noise and vibration control.

2747
Fortier, G.,
and L. P. Dugal
[EFFECTS OF ASCORBIC ACID ON THE RESISTANCE TO INTENSE COLD ON THE MONKEY PRE-EXPOSED OR NON-EXPOSED TO MODERATE COLD] [Abstract] Effets de l'acide ascorbique sur la résistance au froid intense du singe pré-exposé ou non à un froid modéré. — Revue candienne de biologie (Montreal), 13 (1): 61-62. March 1954. In French.
DLC (QH301.R47, v. 13)

Monkeys receiving large doses (325 mg. daily) of ascorbic acid tolerated exposure to intense cold (-20°C.) better than monkeys receiving smaller doses (25 mg.). Pre-exposure to moderate cold, however, brought about an even greater increase in cold tolerance than did administration of ascorbic acid alone.

2748
Forwell, G. D.
THE RESPONSE OF THE LEUCOCYTE COUNT IN MAN TO ENVIRONMENTAL HEAT AND TO EXERCISE [Abstract]. — Jour. Physiol. (London), 124 (3): 66P-67P. June 1954.
DLC (QP1.J75, v. 124)

Leucocyte changes during exposure to heat have been compared with those in exercise producing the same degree of rise of rectal temperature. Healthy young men, unacclimatized to heat, were each the subject for a single experiment which followed rest for an hour at room temperature. The rectal temperature and capillary blood samples were taken immediately before and after the 90-min. treatment period of each experiment. Total white cell counts, differential counts on 300 cells and Arneth counts on 200 neutrophil polymorphs were carried out by the same observer. The 58 subjects were either exposed to heat (26), exercised (16), or acted as control subjects (16). The heated subjects sat in an environment of dry-bulb 42°C., wet-bulb 33°C.; the control subjects in one of dry-bulb 30°C., wet-bulb 18°C. The exercised subjects performed five 10-min. periods of exercise separated by 10-min. rest periods. The exercise consisted of walking on a treadmill at 3 1/2 miles/hr. up a 5° slope. Their enviroment was dry-bulb 22°C., wet-bulb 12°C. In all three environments the subjects faced a linear air movement of 250 ft./min. There was no change in Arneth count in heated, exercised or control subjects. The change in lymphocytes in the heated subjects was the only significant change, the mean increase amounting to 26.8%. There was no significant correlation between degree of increase

in count and extent of rise of rectal temperature. (Quoted in part)

2749
Frache, G.,
A. Carella, P. Murino, and P. Fucci
[INVESTIGATION USING BLOOD GROUPS IN MATCHING FRAGMENTS OF VICTIMS OF AN AERIAL DISASTER] L'indagine gruppospecifica nella ricomposizione delle vittime di un disastro aereo. — Rivista di medicina aeronautica (Roma), 17 (2-3): 163-177. April-Sept. 1954. In Italian, with English summary (p. 177).
DLC (TL555.A1R5, v. 17)

Methods are described which were employed to re-assemble fragments of bodies from an airplane crash involving a DC-6 (at Beirut, Lebanon, January 14, 1954). The procedures were successful, in spite of the fact that the bodies were badly torn after the rapid fall and ensuing explosion of the plane. For the first time, blood-group characteristics were used as a means to aid identification of matching fragments. Combinations and mutations of various types of blood groups (ABO, MN, P, Rh, etc.) resulted in 864 serological classes of distinction, which offered good assurance of success in identification. — The paper concludes with a review of other means of identification employed (morphological, dactyloscopic, etc.)

2750
Fradà, G., 1953
and L. Salamone
[ON THE REACTIONS TO AMBIENT HYPERTHERMIA. I. HEMATOLOGICAL INVESTIGATIONS] Sulle reazioni all'ipertermia ambientale. I. Indagini ematologiche. — Bolletino della Società italiana di biologia sperimentale (Napoli), 29 (8): 1546-1549. July-Aug. 1953. In Italian. DNLM

Hematological studies on 15 normal persons exposed to heat (43°-45°C.) revealed variable erythrocytosis, leucocytosis, neutrophilia, and mononucleosis. In addition, an increase in the blood coagulation time and hemoglobin content were noted along with a decrease in the total blood volume. Four subjects exhibited moderate leucopenia.

2751
Fradà, G., 1953
and L. Salamone
[ON THE REACTIONS TO AMBIENT HYPERTHERMIA. II. MODIFICATIONS IN SOME BLOOD CHEMICAL COMPONENTS] Sulle reazioni all'ipertermia ambientale. II. Modificazioni di alcuni componenti ematochimici. — Bolletino della Società italiana di biologia sperimentale (Napoli), 29 (8): 1549-1552. July-Aug. 1953. In Italian.
DNLM

Fifteen subjects at rest following exposure to high environmental temperature (43°-45°C.) for 2 hours revealed a moderate reduction in blood calcium, potassium, and sodium, and a moderate increase in chlorine and sugar contents. A reduction in blood volume was noted but no significant change in blood urea nitrogen occurred.

2752
Franck, C.,
R. Grandpierre, and P. Arnould
[LIMITS OF EFFECTIVENESS OF BREATHING PURE OXYGEN AT ATMOSPHERIC PRESSURE IN THE NORMAL SUBJECT] Limites d'efficacité de la respiration en oxygène pur à la pression atmosphérique chez le sujet normal. — Revue médicale de Nancy (Nancy), 79: 227-235. April 1-15, 1954. In French. DNLM

It is demonstrated by calculation from partial pressure and blood saturation figures that the inhalation of pure oxygen at atmospheric pressure, a technique in general use during surgery, actually raises only slightly the quantity of oxygen available to the tissues of the normal subject, and hardly at all the utilization of oxygen by the tissues. While the solubility of oxygen in the blood varies directly with the partial pressure of oxygen in the lungs

hemoglobin saturation, which is 97.5% complete at normal oxygen partial pressures, can increase only slightly. Thus the inhalation of pure oxygen with ether (an alveolar oxygen partial pressure of 648 mm. Hg rather than a normal 100 mm.) increases the oxygen content of the blood by only 10%. It is further shown that the tissues absorb from the blood only the amount of oxygen needed for metabolism. In the normal subject, particularly under anesthesia, the oxygen content of the blood during normal atmospheric respiration is quite sufficient for the needs of the tissues, and oxygen utilization is not increased by its inhalation in large amounts.

2753
Frank, H.,
and J. Seusing
[ON THE ALVEOLAR-ARTERIAL OXYGEN PRESSURE DIFFERENCE IN HYPOXIA] Über die alveoläre-arterielle Sauerstoffdruckdifferenz unter Sauerstoffmangel-Atmung. — Deutsches Archiv für klinische Medizin (München), 201 (3): 242-248. 1954. In German. DNLM

Experiments were undertaken to explore the question of aveolar gas exchange in the diseased lung. Alveolar and arterial oxygen pressures were measured under various inspired oxygen pressures. Under normal atmospheric oxygen pressure, an increase in the alveolar-arterial oxygen pressure difference was demonstrated in diseased lungs. This phenomenon might occur through insufficient airing of parts of the lung, through shrinking of the functional membrane, or through damage to the blood vessels. The increased alveolar-arterial oxygen pressure difference in patients with tuberculosis and pneumo-thorax was decreased by hypoxia. In established emphysema, however, this decrease failed to appear. The minute breathing volume in this case was raised. Thus the regulation-mechanism consisting in contraction of blood vessels and consequent slowing of blood in the lungs, resulting in longer exposure to alveolar air, which occurred in the first case, failed to result in emphysema.

2754
Franke, E. K.
THE RESPONSE OF THE HUMAN SKULL TO MECHANICAL VIBRATIONS. — Wright Air Developement Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 45-24, Nov. 1954. v + 16 p. (Project no. 7210, Task no. 71704). AD-61 817 PB 120271

This report describes measurements of the mechanical impedance and of the resonance frequencies of the human skull. The measurements were made in the frequency range from 200 to 1,600 c.p.s., the skull being excited to vibration by means of an electrodynamically driven piston with a small contact area. Data were obtained from living subjects, a dry skull preparation and a human cadaver. The modulus of elasticity of skull bone, calculated from the resonance frequency of the skull, is consistent with the value obtained by static measuring methods. The propagation velocity of bending waves in the skull bones, also calculated from the resonance frequency, agrees satisfactorily with the experimentally determined propagation velocity. It is shown, finally, that a vibrating spherical shell is a suitable model for the skull and describes its vibration patterns with good approximation. (Author's abstract)

2755
Fregly, M. J. 1953
MINIMAL EXPOSURES NEEDED TO ACCLIMATIZE RATS TO COLD. — Amer. Jour. Physiol., 173 (3): 393-402. June 1953. DLC (QP1.A5, v. 173)

Acclimatization to cold, as judged by the colonic cooling rate, manifests itself between the 2nd and 4th day of exposure to cold air (5°C.). Rats exposed to cold for 2-10 days lost their righting reflexes more quickly than controls when taken for a few minutes to 39,000

feet simulated altitude. Therefore, there is a negative cross-adaptation between cold and altitude. This test of loss of righting reflexes at altitude constitutes a criterion of cold acclimatization. During deacclimatization the tolerance to altitude equivalent to 39,000 feet increased toward control values. Acclimatization by intermittent coolings occurred between the 2nd and 3rd exposure to cold. A study of the internal and external temperature gradient throughout the cooling experiment indicated that the slower cooling rate of the acclimatized rats was chiefly the result of a greater heat production rather than a decreased heat loss. (From the author's summary)

2756
Fregly, M. J.
CROSS-ACCLIMATIZATION BETWEEN COLD AND ALTITUDE IN RATS. — Amer. Jour. Physiol., 176 (2): 267-274. Feb. 1954.
DLC (QP1 A5, v. 176)

Rats living in air at 25°C. and subjected for a few minutes daily to 39,000 ft. simulated altitude were able, by the 14th exposure, to tolerate this condition nearly four times as long as they could initially. On the other hand, rats which had lived in air of 5°C. did not significantly change their tolerance to this altitude after 14 daily exposures. In another group of rats acclimatized to 19,000 ft. altitude by continuous exposure for 2 weeks, characteristic changes were seen in hemoglobin concentration and hematocrit ratio. When subjected to a cooling rate experiment in air of 5°C., these rats cooled far more quickly than controls. Maximal oxygen consumption during the cooling test was the same in altitude and control rats, while resting oxygen consumption was significantly less in the altitude group. — In general, there appeared to be a negative cross-acclimatization both between cold and altitude and between altitude and cold in rats. (Author's summary, modified)

2757
French, G. N.,
and A. L. Hall
THE TIME COURSE OF CARBOXYHEMOGLOBIN FORMATION IN SUBJECTS EXPOSED TO CARBON MONOXIDE FOR PERIODS OF TEN TO SIXTEEN HOURS, AND ITS MODIFICATION BY INTERMITTENT BREATHING OF 100% OXYGEN. — Naval School of Aviation Medicine, Pensacola, Fla. July 6, 1954. 7+7 p. (Project Report no. NM 001 059.32.01). AD 44 290 UNCLASSIFIED

Ten subjects were exposed for 14 hours to carbon monoxide in air in concentrations of .0071% to .0120%. Ninety percent of equilibrium concentration of carboxyhemoglobin (COhgb) was present in all but one subject by 12 hours. One-half equilibrium concentration of COhgb was reached in an average of 3 hours. Six subjects exposed to .028% -.046% CO breathed 100% O_2 by mask a given part of each exposure hour. It required 30 minutes of O_2 breathing in each hour to keep COhgb below 15% for 12 hours when exposed to .046% CO. Incidental observations during intermittent exposure suggest that CO diffuses from the blood for hours to combine with extravascular substances. (Naval School of Aviation Medicine abstract)

2758
French, R. S.
THE EFFECT OF INSTRUCTION ON THE LENGTH-DIFFICULTY RELATIONSHIP FOR A TASK INVOLVING SEQUENTIAL DEPENDENCY. — Jour. Exper. Psychol., 48 (2): 89-97. Aug. 1954. DLC (BF1.J6, v. 48)

The effect of instruction on the length-difficulty relationship was studied for a complex rational learning task. Data were obtained for problems 4-, 6-, 8-, and 10-units in length, both with and without instruction in the principles underlying solution of the problems. The task involved the discovery of the correct sequence in which to depress a row of buttons, utilizing

the information on relative sequence position which could be deduced from the dependency relations of a corresponding panel of lights. The subjects were 160 basic trainees at Lackland Air Force Base. It was found that when no specific instruction was given, the 6-, 8-, and 10-unit problems were of approximately equal difficulty, while the 4-unit problem was significantly less difficult. With instruction in underlying principles, on the other hand, the 4-, 6-, and 8-unit problems were found to be of approximately equal difficulty, while the 10-unit problem was now relatively more difficult. In addition to the shift in relative difficulty, the detailed instructions were effective in reducing error scores generally for all the conditions. (Author's summary)

2759
French, R. S.
IDENTIFICATION OF DOT PATTERNS FROM MEMORY AS A FUNCTION OF COMPLEXITY. — Jour. Exper. Psychol., 47 (1): 22-26. Jan. 1954. DLC (BF1.J6, v. 47)

The identification of dot patterns from memory was studied as a function of complexity of the patterns. Each of 768 basic trainees was required to learn the corresponding arbitrary city names for a group of 12 random dot patterns representing the possible appearance of each city on a radar scope. The number of dots in the patterns was varied from 1 to 12 for independent groups of subjects as a means of varying complexity. The results indicate that a degree of complexity represented by six or eight dots is optimal for identification under these conditions. Ease of identification is clearly shown to be associated with patterns having dots aranged either symmetrically or in linear arrays. (Author's summary)

2760
French, R. S.
PATTERN RECOGNITION IN THE PRESENCE OF VISUAL NOISE. — Jour. Exper. Psychol., 47 (1): 27-31. Jan. 1954. DLC (BF1.J6, v. 47)

The recognition of a "target" pattern of dots against a background of "visual noise" was studied as a function of both the number of target dots from 2-9, using 192 different combinations of random target patterns embedded in random noise patterns varying from 1-8 dots. The subjects were 192 basic trainees at Lackland Air Force Base. The results indicate that increasing the complexity of the target pattern by increasing the number of elements improves recognition performance progressively. On the other hand, increasing the complexity of the visual noise produces a progressive decrement in recognition of the target. Increasing the number of elements in the target pattern beyond seven or eight seems to produce little if any further improvement in recognition performance. In general, recognition performance improves as the ratio of number of target dots to number of noise dots increases up to a target-to-noise ratio of about 3:1. (Author's summary)

2761
Fry, W. J. 1953
ACTION OF ULTRASOUND ON NERVE TISSUE—A REVIEW. — Jour. Acoust. Soc. Amer., 25 (1): 1-5. Jan. 1953. DLC (QC221.A4, v. 25)

Research dealing (1) with the functioning and structural changes produced by high-level ultrasound in the tissues of the central nervous system, and (2) with the physical mechanisms underlying these changes is reviewed. The cell bodies of neurons in the central nervous system are particularly susceptible to ultrasound, the larger neurons showing a greater susceptibility. Ultrasound produces a loss of function which may be reversible or irreversible depending on the dosage, irreversible changes being accompanied by changes in the structure of the cell. The action of ultrasound is selective and specific, in that the dosage may be adjusted to cause irreversible changes in neurons without observable damage to other components of the tissue. Both

temperature and cavitation are rejected as the physical mechanism by which ultrasound produces damage of nerve cells. The author's own experiment was done on frogs.

2762
Fry, W. J.
F. J. Fry, R. B. Fry, D. Tucker, and W. Welkowitz
PHYSICAL ACTION OF INTENSE HIGH FREQUENCY SOUND ON VERTEBRATE TISSUE. — Univ. of Illinois, Urbana (Contract AF 33(038)20922); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-152, Sept. 1954. x+149 p. (RDO no. 695-63). AD 56 536 PB 111619

Studies were made of the physical mechanism of the action of sound on central-nervous-system and muscle tissues. Temperature changes accompanying acoustic propagation through tissue were measured. A method was devised for measuring acoustic absorption coefficients of tissue by subjecting a thermocouple imbedded in the tissue to a pulse of acoustic radiation of known intensity. A theoretical mechanism is proposed to explain acoustic absorption in tissue. Sound may produce both reversible and irreversible effects on the central nervous system. Paralysis of the hind legs occurred after irradiation of the lumbar enlargement region of the spinal cord. The reversible suppression of the 2 neuron arc reflexes was demonstrated with rat spinal cords. Under appropriate ultrasonic dosage, the action potential of the biceps muscle of the frog's leg was permanently blocked. (From the AD abstract)

2763
Frykholm, A.
[RELUCTANT AND APPREHENSIVE ATTITUDES TOWARD FLYING] Flygolust; flygradsla. — Meddelanden från flyg- och naval-medicinska nämnden (Stockholm), 3 (3): 4-10. 1954. In Swedish. DNLM

Whenever the latent conflict between desire to fly and fear of flying becomes activated in an individual, the desire to fly is suppressed, and the individual exhibits attitudes of reluctance and apprehensiveness toward flying. As long as these attitudes do not become fixed, they are still to be considered normal. Improvements of selection techniques have led to more reliable predictions as to whether an individual will be able to complete flight training. Experience has shown, that if a student exhibits fear at early stages in flight training, he should be rejected immediately. Success in flight training is also influenced by the degree of experience and training of flight instructors, physical environment, and economical problems. A survey of the attrition rate during pilot training in the Swedish Air Force showed four major reasons for dropouts during flight training: The first group (students who were unsuccessful in training) constituted 50% of the total attrition rate; however, the number of rejects tapered off toward the end of training. The second group (those leaving for medical reasons) increased percentage-wise toward the middle of the training period and fell off toward the end of the training. The majority of these were rejected for psychological reasons, expressed in psychosomatic symptoms. The same curve was obtained in the case of the third group, which included those who either resigned voluntarily or were rejected for unspecified reasons. Unfortunately, the fourth group (pilots who suffered accidents) tended to increase at the later stages of training. However, direct comparisons cannot be made, as the actual flying time in solo flights also increased at later stages of training.

2764
Fuchs, E. F.,
J. Zeidner, B. P. Harper, and C. D. Johnson
FACTORIAL COMPOSITION OF ARMY AND AIR FORCE CLASSIFICATION BATTERIES. — Adjutant General's Office (Army). Personnel Research

Branch, Washington, D. C. PRB Technical Research Note no. 24, March 1954. 3+25+7 p. (Army Project no. 29562000). AD 30 764 UNCLASSIFIED

The Army and Air Force Classification Batteries and two tests from the Navy Battery were given to approximately 300 solders and 1800 airmen. On the basis of their Aptitude Area I scores, 500 men were selected to be representative of a full mobilization population as indicated by the distribution of Army General Classification Test scores of men in the service in 1945. Two factor solutions were obtained from a 44-variable intercorrelation matrix, the oblique and orthogonal solutions. An oblique solution was accomplished to obtain clear descriptions of the variables in terms of the smallest number of factors. The factors identified include mechanical experience, verbal comprehension, numerical reasoning, spatial relations, Biographical Inventory prestige, and Army Preference Blank prestige. The mathematical relationship of the two sets of factors obtained from the orthogonal and oblique solutions indicated close agreement. The information obtained from this study can be used to determine which tests in the two batteries are measuring essentially the same abilities or what modifications are needed to develop the desired common core of tests. (AD abstract)

2765
Fugitt, C. H.
DIRECT CINERADIOGRAPHY. — Jour. Aviation Med., 25 (6): 660-663. 1954. DLC (TL555.A1A4, v. 25)

This is a description of a device which has been developed at the Aviation Medical Acceleration Laboratory in Johnsville, Pennsylvania, for taking rapid serial X-ray exposures. There are two basic methods by which such X-ray motion pictures can be taken; one is called cinefluorography and uses a conventional motion picture camera for photographing a fluoroscope screen upon which the X-ray image appears. Two major disadvantages to this method are the loss of resolution which occurs on the duplicating film and the hazardous amount of X-ray energy required to produce an image of sufficient brightness on the fluoroscope screen so that motion pictures can be taken. The second method is direct cineradiography which provides for the rapid production of serial pictures directly. The major drawback to this technique has been the lack of a suitable mechanism which can stop and start the film each time a picture is taken and still maintain an average rate of picture frame production (24 per second). The device which the author describes has achieved frame rates of 50, 100, and 150 frames (9 inch square) per second by utilizing intermittent pulse firing of the X-ray tube of 10 microseconds and continuous movement of the film.

2766
Fulton, J. D., 1953
D. E. Singer, B. S. McNeil, and R. B. Mitchell
A STUDY OF THE MICROORGANISMS OF THE UPPER ATMOSPHERE: THE AIR-BORNE MICROPOPULATION AT 3,000 FEET IN EARLY WINTER OVER SELECTED WEST COAST CITIES. — School of Aviation Medicine, Randolph Field, Texas. May 1953. iii + 21 p. (Project no. 21-5501-0001, Report no. 6). AD 16 355 UNCLASSIFIED

Data presented in this report were obtained from samples collected from five locations at an altitude of 3,000 feet over Los Angeles, Calif., San Francisco, Calif., Portland, Oreg., and Seattle, Wash., in late November. The air-borne micropopulations at an altitude of 3,000 feet over these sampling sites were found to be low. The low micropopulations observed may have been due to the presence of a zone of temperature inversion between the ground and the sampling altitude and to the low numbers of microorganisms carried into the area by the lateral movement of the winds. When a zone of temperature inversion remained

strong and unbroken between the ground and the sampling altitude, the micropopulations remained low throughout the day at the sampling altitude. When a zone of temperature inversion weakened and rose to higher altitudes as the day progressed the micropopulations at 3,000 feet were considerably higher in the afternoon than they were in the morning. The organisms isolated from samples collected over the different cities were identified as to genera. There were some variations in the numbers and types of genera, collected from the different sampling locations over the various cities. The data are too limited for drawing any conclusions. Additional sampling missions are required throughout the year over the same sites in order to obtain sufficient information on which to base definite opinions. The various factors which might possibly influence the results obtained and which must be considered in future work are briefly reviewed. (Authors' summary and conclusions)

2767

Fulton, J. D., 1953
I. R. Hill, D. E. Singer, B. S. McNeil, and R. B. Mitchell

STUDIES ON MICROORGANISMS OF THE UPPER ATMOSPHERE: AIRBORNE MICROORGANISMS OCCURRING OVER THE GULF OF MEXICO AND THE CARIBBEAN AREA (TRIP NUMBER 3, 16 THROUGH 20 SEPTEMBER 1952). — School of Aviation Medicine, Randolph Field, Tex. [1953]. 72 p. (Project no. 21-5501-0001, Report no. 7). UNCLASSIFIED

Space volumes were sampled for air-borne microorganisms at an altitude of 2,000 feet over the Gulf of Mexico and the Caribbean Sea. Only three genera of bacteria (Bacillus, Corynebacterium, and Micrococcus) and eleven different genera of fungi of the order Moniliales were collected and identified. The terms high, medium, and low as applied to air-borne micropopulations are defined, and an attempt is made to determine the expected air-borne micropopulations sampled in these terms without recourse to the actual microbiological results obtained. The expected micropopulations are compared with the observed, and an attempt is made to determine a possible meteorological basis for the variation.

2768

Fulton, J. D., 1953
and R. B. Mitchell

STUDIES ON MICROORGANISMS OF THE UPPER ATMOSPHERE: THE MICROPOPULATION OF CLOUDS CONTAINING SUPERCOOLED MOISTURE. — School of Aviation Medicine, Randolph Field, Tex. Jan. 1953. iii + 7 p. (Project no. 21-5501-0001, Report no. 8). UNCLASSIFIED

Microorganisms were collected from clouds containing supercooled moisture at all altitudes (4,000 to 10,500 feet), and the locations sampled. No correlation was observed between the number of microorganisms found, the location, wind direction and velocity, altitude, and free air temperature. In addition, the efficiency of the rotating-cylinder ice-collection instrument as a microbiologic sampler was found to be low as compared to the gel-foam sampler. Therefore, it is recommended that additional studies relative to the micropopulation of clouds containing supercooled moisture be accomplished with the gel-foam sampler. (Authors' summary and conclusions, modified)

2769

Fulton, J. D.,
and R. B. Mitchell

STERILIZATION OF OXYGEN MASKS WITH ETHYLENE OXIDE. — School of Aviation Medicine, Randolph Field, Tex. Unnumbered Report, June 1954. 5 p. AD 43 308 UNCLASSIFIED

Techniques for the sterilization of oxygen masks with ethylene oxide gas have been developed and evaluated. Under the experimental conditions employed, it was found that A-14 type oxygen masks could be sterilized by

exposure to an atmosphere containing 1,500 mg. of ethylene oxide per liter, but only 16 hours' exposure to an atmosphere of 1,000 mg. of ethylene oxide were required to sterilize A-13 type masks. The residual ethylene oxide in the mask could be removed by aeration for a 24-hour period. Masks so treated were found to be nontoxic to test subjects. (Authors' summary)

2770
Funkenstein, D. H.,
and L. W. Meade
NOR-EPINEPHRINE-LIKE AND EPINEPHRINE-LIKE SUBSTANCES AND THE ELEVATION OF BLOOD PRESSURE DURING ACUTE STRESS. — Jour. Nervous and Mental Diseases, 119 (5): 380-397. May 1954.
DLC (RC321.J83, v. 119)

Based on the results of preliminary experimentation which differentiated subjects responding to mental stress with elevated blood pressures into two distinct populations, a hypothesis is proposed that one type of elevated blood pressure is associated with excessive secretion of epinephrine, and the other with excessive secretion of norepinephrine. Differentiation was made experimentally from the blood pressure reaction following mecholyl chloride injections. Further experiments investigated the mecholyl reaction in subjects with elevated blood pressures stabilized previously with injections of epinephrine and nor-epinephrine. It was found that when the blood pressure was elevated by infusions of epinephrine, the fall in systolic blood pressure following mecholyl was sustained and did not return to the epinephrine-stabilized level within the observation period. In contrast to this, when the systolic blood pressure of the same subjects was elevated 25% above its basal level by constant intravenous infusion of nor-epinephrine, the fall in blood pressure following mecholyl was not sustained and the pre-injection level was reached within the observation period. These two blood pressure patterns evoked by a known chemical agent were analyzed statistically in the same manner as the data in preliminary experiments. The comparison suggested that the mediating substance in one type of elevated blood pressure in association with psychiatric illness and in normatensive students under psychological stress was an epinephrine-like substance, and in the other type a nor-epinephrine-like substance. The blood-pressure reaction following mecholyl administration appears to be a reliable indicator of the type which was present in a given case. A discussion of the probable role of epinephrine and nor-epinephrine in sympathetic nervous system transmission was made. (Authors' summary, modified)

2771
Gabis, M. S.
TOXICITY OF NON-INFLAMMABLE SOLVENT CLEANERS FOR INSULATED ELECTRICAL MOTOR PARTS. — Industrial Test Lab., Philadelphia Naval Shipyard, Pa. Evaluation Report no. 2335, April 1954. v+7 p. (NS-041-001). AD 30 510
UNCLASSIFIED

Three non-flammable solvent cleaners for electrical motors were evaluated to determine relative toxic and fire hazards. The three were "Freon 113" (trifluorotrichloroethane), "Motor Cleaning Mixture No. 49" (70% Stoddard solvent, 25% methylene chloride, 5% perchlorethylene — all by volume) and "Mixture 330-12" (40% Freon 113, 40% Freon-112 [difluorotetrachloroethane] and 20% 1, 1, 2-trichloroethane — all by weight). Carbon tetrachloride was used as a comparison solvent. Acute and chronic exposures of laboratory animals were made against these solvents. Flash and explosion data were also obtained. On the basis of the results, Freon 113 is recommended as the safest solvent cleaner. (Author's abstract)

2772
Gagne, R. M.,
and E. A. Bilodeau
THE EFFECTS OF TARGET SIZE VARIATION ON SKILL ACQUISITION. — Air Force Personnel and Training Research Center. Skill Components Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. AFPTRC-TR-54-5, April 1954. iv+16 p. AD 32 407 UNCLASSIFIED

Two experiments are reported which investigated the effect of variation in target size in a motor task on performance measured by transfer of training. In the first study, three groups of subjects were given three different amounts of practice on a narrow-target task and then were shifted to a wide-target task. Three other groups received different amounts of training on the wide-target task before shifting to the narrow-target task. — In a second study, the narrow target was further diminished in size in order to extend the investigation of this variable. A second change was the concealment of target center from the subject. — The data from Experiment 1 gave no evidence of differential transfer from wide to narrow targets, as compared with that from narrow to wide targets. Actually, transfer was about 100% in both instances. The conclusion was no different in the second study where the target centers were obscured. The results indicate that variations in the size of target did not have a differential reinforcing or motivating effect on the acquisition of skill.

2773
Gall, W. J.,
A. F. Rogers, and J. M. Yoffey
A LOW-PRESSURE CHAMBER [Abstract]. — Jour. Physiol. (London), 124 (3): 54P. June 1954.
DLC (QP1.J75, v. 124)

A 70-liter reinforced chamber with a Perspex roof is continuously exhausted by a pump. Filtered air is admitted through a variable leak, which is controlled by a servo-mechanism keeping the simulated altitude constant and independent of barometric fluctuations. Rate of air flow is variable up to 30 liters/min. and the simulated altitude up to 30,000 ft. Gauges indicate the simulated altitude (continuously recorded), rate of climb, air flow, and temperature. The servo-mechanism compares the air pressure in the chamber with a constant pressure and controls a reversible motor which is geared to a fine control valve. Food can be introduced through a hatch and water through a separate tube. Urine is withdrawn from the bottom of the chamber. (Quoted in full)

2774
Games, B. R.,
C. C. Lutz, and E. G. Vail
T-1 ALTITUDE SUIT EVALUATION IN THE F-86D FLIGHT SIMULATOR. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-170, April 1954. iv+13 p. (SEO no. 660-141). AD 35 127
UNCLASSIFIED

An investigation employing the F-86D flight simulator was conducted to determine the feasibility of using flight simulators to train pilots in the use of high-altitude suits. The findings established that it is possible for a pilot to maintain controlled flight in the F-86D simulator while wearing the T-1 altitude suit in the pressurized condition. All controls in the F-86D simulator are accessible with the T-1 altitude suit uninflated. Some controls at the aft ends of the console are impossible to reach with the suit pressurized. Those controls which are impossible to reach while pressurized will not adversely affect emergency descent procedures. It was found impossible to release suit pressure after an inflation because of the pilot's inability to reach the release valve on the suit connection. Laboratory models of a relocated relief valve are undergoing tests, and attempts are being made to increase arm mobility of the suit in the pressurized state.

2775
Gan, P., 1952
and G. Polak
[THE EFFECT OF HISTAMINE ON THE RESISTANCE TO HIGH ALTITUDE ANOXIA] Vliianie gistamina na resistentsiiu v otnoshenii vysotnoĭ anoksii. – Chekhoslovatskaia fiziologiia (Praga), 1 (1): 66-74. 1952. In Russian.
DLC (QP1.C417, v. 1)

Histamine administered to mice subcutaneously in doses of 100 mg. per kg. two hours before they were subjected to high altitude increased the resistance of the mice to anoxia. It ameliorated the severity of the convulsions, which appeared less frequently and only at considerably lowered barometric pressure. Repeated subjection of mice to anoxia developed a high degree of resistance to its effects. The maximum of such resistance appeared after 30 minutes of exposure to the lowered barometric pressure; after two hours it returned to its normal level.

2776
Gan, P. 1953
[THE EFFECT OF ADENOSINE TRIPHOSPHORIC ACID AND OF CATIONS ON THE RESISTANCE TO HIGH ALTITUDE ANOXIA] Vliianie adenosinetrifosfornoĭ kisloty i kationov na resistentsiiu v otnoshenii vysotnoĭ anoksii. — Chekhoslovatskaia fiziologiia (Praga), 2 (2): 178-182. 1953. In Russian.
DLC (QP1.C417, v. 2)

Phosphorus metabolism plays an important role in anoxia. Thus, adenosine triphosphoric acid, adenylic acid, and magnesium chloride enhanced the anoxia. Calcium chloride injected simultaneously with magnesium chloride or with adenosine triphosphoric acid lowered the increased resistance. It is suggested that these substances act by way of the interoceptors; attention is called to the particular interaction between the ions and the adenosine phosphatases.

2777
Gardner, J. F.,
and R. J. Lacey
AN EXPERIMENTAL COMPARISON OF FIVE DIFFERENT ATTITUDE INDICATORS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-32, May 1954. v+20 p. (RDO no. 694-31). AD 34 642
PB 122869

Two studies were conducted in which five simulated aircraft attitude indicators, representing three different indicating principles, were compared. Two indicators were of the "earth reference" type, in which the moving element represented the horizon as on the conventional attitude indicator. Two indicators were of an "airplane reference" type, which presented aircraft rather than horizon movement. The fifth indicator provided a "stabilized sphere" type of presentation. Tests were made in a C-8 Link Trainer and records were made of pilot performance for a variety of flight maneuvers, control reversals following simulated rough air gusts and pilot preferences. The indicators were flown by experienced Air Force pilots and by college students with no prior flight experience. The Air Force pilots used in this study were highly experienced on the earth reference type of indicator, and had not previously flown indicators using the airplane reference principle. They made more aileron reversals on the airplane reference type indicators. In the pitch dimension, however, they made slightly fewer control reversals on these indicators. Moreover, their preferences somewhat favored the unfamiliar airplane reference indicators. For the college students, both the control reversal and preference data favored the airplane reference principle. (From the authors' abstract)

2778
Garvey, W. D.,
and W. B. Knowles
POINTING ACCURACY OF A JOY

STICK WITHOUT VISUAL FEEDBACK. — Jour. Applied Psychol., 38 (3): 191-194. June 1954. DLC (BF1.J55, v. 38)

An experiment was conducted to determine how accurately man can point a joy stick at visual targets (small points of light in an otherwise totally dark room) without visual feedback as to the position of the stick. It was found that pointing errors ranged from 1° to 52° with a mean of 13.4°. Ninety per cent of the pointing errors were 25° or less in magnitude. There was a correspondence between magnitude of errors and locus of the visual target. Errors were largest for responses made to targets located to the right and above the center of the room. There was a tendency for responses to be more accurate if they were made to targets either to the left or below the center of the room. There was a tendency for subjects to undershoot targets located around the periphery of the target space and to overshoot targets located around the center of the space. (Authors' abstract, modified)

2779
Gaspa, P. 1953
[PHYSIOLOGICAL PROBLEMS RAISED IN ASTRONAUTICS] Problèmes physiologiques posés par l'astronautique. — Revue de pathologie générale et comparée (Paris), 53 (653): 1485-1503. Dec. 1953. In French. DNLM

A review is presented of studies on the physical environment of space and on the physiological and psychological effects which may be engendered by such an environment. Included are descriptions of pressure, temperature, and chemical composition of the atmosphere at various altitudes; radiation and meteoritic hazards; and the air or space craft which will be used (including possible methods of propulsion). Physiological problems in space will be of four orders: (1) problems of an airtight cabin environment; (2) problems of gravity changes; (3) problems of protection against radiations; and (4) psychological problems. The problems of living in a closed-space environment are chiefly concerned with O_2-CO_2 exchange, feeding and elimination of body wastes, and maintenance of a suitable cabin temperature. The probable effects of zero gravity upon the circulation and respiration, upon the inner ear (impressions of disorientation, reflex deficiencies), and upon muscular coordination are discussed.

2780
Gatland, K. W.
PROGRESS TOWARDS ASTRONAUTICS. — Jour. Brit. Interplanetary Soc. (London). 13 (3): 142-166. May 1954. DLC (TL790.A1B7, v. 13)

Work in such fields as high-speed aerodynamics, aeromedical research, high-altitude sounding and guided-missiles is daily contributing to astronautical progress. Some of the most important current activities are concerned with the problems of supersonic flight, stability and control, automatic and remote guidance, aerodynamic heating, etc., and — in the realm of "inhabited" aircraft and missiles — the design of pressure suits, experiments with high-g acceleration and, at the other extreme, research into the effects of zero-g. Continued experience in these fields may shortly lead to the first true space-flight projects, viz.: a minimum satellite vehicle, with the ultimate implication of human flight beyond the Earth's atmosphere. (Author's summary)

2781
Gatto, L. E.
UNDERSTANDING THE "FEAR OF FLYING" SYNDROME. I. PSYCHIC ASPECTS OF THE PROBLEM. — U.S. Armed Forces Med. Jour., 5 (8): 1093-1116. Aug. 1954. DLC (RC970.47, v. 5)

"Fear of flying" serves as a focal point for displacement of anxieties from other emotional conflicts. It is more difficult to recognize the displacement because this anxiety is attached to a basic and inherent fear of falling, death, or being maimed. However, the fear-of-flying syndrome is a complex reaction

occurring among previously adjusted flying personnel and characterized by various defensive and maladaptive behavioral processes, which express excessive anxiety over various external and internal conflicting demands imposed on men by instinctual needs, internalized authority or superego forces, and external reality. It may or may not be precipitated by a previous dangerous incident. Early psychotherapy of a ventilating and reassuring type exposing maladaptive defenses can resolve anxiety states which, though appearing as "fear of flying," are really related to many other basic emotional conflicts. Cases where "fear of flying" is manifested as a result of defective motivation, may be handled sucessfully by administrative means.

2782
Gatto, L. E.

UNDERSTANDING THE "FEAR OF FLYING" SYNDROME. II. PSYCHOSOMATIC ASPECTS AND TREATMENT. — U. S. Armed Forces Med. Jour., 5 (9): 1267-1289. Sept. 1954.
DLC (RC970.47, v. 5)

The "fear of flying" syndrome may manifest itself in a variety of somatic complaints, which appear to be far in excess of the physical findings. This "somatic compliance" is the expression of anxiety related to underlying conflicts, frustrations, and ambivalent emotions channeled into physical systems. If this condition is recognized in early stages, it is possible to salvage flying personnel by exposing the underlying emotional difficulties and either treating the patients with psychotherapy to resolve these or, if necessary, handle the case administratively. Undue emphasis on out-drawn diagnostic procedures is to be avoided, since it tends to fixate and structure the original psychosomatic complaint, eventually leading to a loss of potentially useful personnel. Responding appropriately to first indications of a somatized "fear of flying" syndrome, the flight surgeon may offer enough ego support to help the person recognize the fundamental emotional difficulties and resolve them adequately. "Singing in harmony" with the patient or over-identification, which leads to excessive dependency are methods to be avoided. The paper emphasizes the role of the superego as a prognostic and therapeutic agent, which should be assessed and directed by the flight surgeon.

2783
Gauer, O. H.,
J. P. Henry, H. O. Sieker, and W. E. Wendt

THE EFFECT OF NEGATIVE PRESSURE BREATHING ON URINE FLOW. — Jour. Clinical Investigation, 33 (2): 287-296. Feb. 1954.
DLC (R11.J67, v. 33)

In seventy experiments, forty dogs were exposed to periods of constant negative pressure breathing of the order of -10 cm. H_2O. This stimulus consistently increased urine flow from an average of .030 cc. per kg. per min. to .066 cc. per kg. per min. The most outstanding effect of negative pressure breathing is a disturbance of blood distribution. With regard to this hemostatic imbalance, diuresis with negative pressure breathing is only one of many conditions in which, in normal subjects, an engorgement of the intrathoracic circulatory organs, no matter how induced, coincides with increased urine flow. As a working hypothesis, it is suggested that stretch receptors in the pulmonary circulation and/or the chambers of the heart and the great veins may represent the sensitive part of a mechanism linking hemostatic events with urine excretion for the control of plasma volume. (59 references) (From the authors' summary)

2784
Gauer, O. H.,
and W. E. Hull

PARADOXIC FALL OF PRESSURES IN THE RIGHT AND LEFT AURICLES AND THE PULMONARY ARTERY WITH A HEAD-DOWN TILT. — Federation Proceedings, 13 (1^1): 52. 1954.
DLC (QH301.F37, v. 13)

Clark, Hooker, and Weed first described a paradoxic fall of right auricular pressure when an anesthetized dog was tilted head down. This phenomenon was confirmed by Wilkins, Bradley, and Friedland to exist also in humans. By the use of intravascular miniature manometers, placed at various locations in the left heart, the right heart, and the pulmonary artery in anesthetized dogs, two pressures were recorded simultaneously while tilting the animals. It was found that the pressure fall with the head-down tilt is not confined to the right auricle but extends throughout the intrathoracic circulation. Measurements in humans by Asmussen, Christensen and Nielsen and the observation in the dogs that the arteriovenous pressure gradient across the lungs is reduced in the head-down posture suggest that the filling of the intrathoracic circulation is probably increased in spite of decreased intravascular pressures. This observation serves to emphasize the relative independence of volume and pressure as hemostatic parameters. (From the authors' summary)

2785
Gell, C. F.,
and H. N. Hunter
PHYSIOLOGICAL INVESTIGATION OF INCREASING RESISTANCE TO BLACKOUT BY PROGRESSIVE BACKWARD TILTING TO THE SUPINE POSITION. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5406, June 30, 1954. iii+26 p. (Project Report no. NM 001 060.01.03). AD 36 856 UNCLASSIFIED
Also published in: Jour. Aviation Med., 25 (6): 568-577. Dec. 1954.
DLC (TL555.A1A4, v. 25)

A reclining seat was constructed which is capable of being tilted backward and fixed at angles of 15, 25, 35, 45, 55, 65, 77, and 85 degrees from the vertical. The seat was attached to a human centrifuge, and six male subjects were exposed to 5-second runs from 1 g to the g level where gray-out occurred for each position. There was no increase in blackout tolerance until a backward tilt of 45° was reached, when the tolerance increase was of the order of 1/4 g; the first significant increase occurred at 77°, where an increase tolerance of 2.5 g was noted. At the 85° tilt, two subjects were exposed to 10 transverse g for 5 seconds without reaching a grayout. At 77° and above, tachycardia was recorded which was followed by a slower than normal pulse after the runs were completed; during deceleration, a relative bradycardia occurred. At 77° and above, ear pulse magnitude and ear opacity decreased; at 85°, ear opacity increased and the ear pulse magnitude first decreased and then increased. The most pronounced symptom which occurred at levels of supination greater than 65° was a pressure sensation in the thorax and abdomen.

2786
Gell, C. F.,
B. D. Polis, and O. Bailey
STUDY OF THE EFFECT OF ACCELERATION STRESS ON FLUID AND ELECTROLYTE DISTRIBUTION IN MAMMALIAN SYSTEMS. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5401, Feb. 9, 1954. iii+25p. (Project Report no. NM 001 060.05.02). AD 36 633 UNCLASSIFIED

An investigation was made of the sodium and potassium contents of Wistar rat brains after the animals had been subjected to experimental positive-acceleration stress or "tie stress" (tied on a grid). The concentration of brain potassium was significantly increased over the controls by the application of either acceleration or tie stress. No significant changes occurred in the brain sodium content of the stressed animals as compared to controls. There was an apparent increase in the water content of the brain when the tie stress was prolonged; this was not found with acceleration stress. The significant finding of this study was

the marked shift in ratio of potassium to sodium that occurred in the brain of the rats exposed to acceleration stress when compared to tie stress and normal control. The results indicate that an apparent electrolyte imbalance occurs in the brain under acceleration stress. — An extensive review of the literature precedes the analysis of the investigation. (Authors' summary, modified)

2787
Gellhorn, E.
BLOOD SUGAR AND AUTONOMIC NERVOUS SYSTEM. — Acta neurovegetativa (Wien), 9 (1-4): 74-90. 1954. In English. DNLM

Experimental investigations show that anoxia, cold, fever, emotional excitement, and stimulation of the hypothalamus elicit a discharge over both the vago-insulin and sympathetico-adrenal systems with the latter predominating as manifested by hyperglycemia. Similar effects are produced by convulsions (electro-shock, metrazol) and by drugs (cocaine and bulbocapnine). Exposure to heat likewise acts on both systems, but the effect on the vago-insulin system is predominant, as seen in normal animals upon exposure to heat. A slight rise in blood sugar (of doubtful significance) is followed by a moderate, statistically significant hypoglycemia. The action of the thyroid on the centers of the autonomic nervous system and clinical findings on changes in blood sugar in conditions of emotional stress are discussed with respect to disturbances in the normal balance of these systems. (Author's summary, modified)

2788
Gellhorn, E.,
W. P. Koella, and H. M. Ballin
INTERACTION ON CEREBRAL CORTEX OF ACOUSTIC OR OPTIC WITH NOCICEPTIVE IMPULSES: THE PROBLEM OF CONSCIOUSNESS. — Jour. Neurophysiol., 17 (1): 14-21. Jan. 1954. DLC (QP351.J6, v. 17)

In lightly anesthetized cats nociceptive stimuli increase the responsiveness of the auditory and visual projection areas to acoustic and optic stimuli respectively. This increased reactivity is thought to be due to the interaction at the cortical level of impulses originating in the hypothalamic-cortical system activated by nociception and those originating in the specific projection systems. Even subthreshold nociception stimuli, i.e., those which do not cause asynchrony in the electrocorticogram, are effective. The increased responsiveness of the specific projection areas is indicated by increased amplitude and/or greater tendency to multiple potentials on stimulation with a series of clicks or optic flashes and also by an extension of the cortical area from which the response to a given optic or acoustic stimulus can be obtained. If strychnine is applied to the auditory projection area the interaction between nociceptive and acoustic stimulation may result in convulsive responses in synchrony with the acoustic stimuli, whereas without nociception only small auditory potentials are evoked. Moreover, this interaction leads to a spread of convulsive activity to other parts of the auditory area. It is assumed that the interaction between the hypothalamic-cortical system and a specific cortical projection area is the physiological basis of sensation and perception. (Authors' summary)

2789
Gerathewohl, S. J. 1953
[THE PSYCHOPHYSIOLOGY OF ACCELERATION EFFECTS] Die Psychophysiologie der Beschleunigungswirkung. — Weltraumfahrt (Frankfurt), 4 (1): 15-19. Jan. 1953. In German. DLC (TL789.W45, v. 4)

This is an excerpt from the author's book, "Die Psychologie des Menschen im Flugzeug" (Psychology of Man in Flight) published in 1954 (cf. item no. 2793).

2790
Gerathewohl, S. J.
COMPARATIVE STUDIES ON ANIMALS AND HUMAN SUBJECTS IN THE GRAVITY-FREE STATE. — Jour. Aviation Med., 25 (4): 412-419. 1954.
DLC (TL555.A1A4, v. 25)

A review is presented of the existing knowledge on the psycho-physiological aspects of sub- and zero-gravity conditions during dives and in parabolic flight; special emphasis is placed on the investigations of H. J. A. von Beckh (cf. item no. 2460).

2791
Gerathewohl, S. J.
CONSPICUITY OF FLASHING LIGHT SIGNALS: EFFECTS OF VARIATION AMONG FREQUENCY, DURATION, AND CONTRAST OF THE SIGNALS. — School of Aviation Medicine, Randolph Field, Tex. June 1954. 7 p. (Project no. 21-1205-0012, Report no. 1). AD 41 508
PB 115443
Also abstracted in: Amer. Psychologist, 9 (8): 375. Aug. 1954.
DLC (BF1.A55, v. 9)

The experiments reported have produced evidence that, when the observer is engaged in a very complex task and does not know when and where a light signal may appear, its efficacy as a warning or indicator is determined not by the luminance of a single flash alone, but by the conspicuity of a series of flashes. In this case, a significant interaction was found between flash frequency and the brightness contrast, at which the signal is seen. At either high contrast or high frequency, a change of the other factors does not produce a significant alteration of conspicuity. At the lowest contrast level, however, conspicuity increases as frequency increases (within our frequency range), and with slow frequencies, conspicuity increases as contrast increases. The effect of flash duration has not been clarified as yet. Results at this time indicate that for practical application the most conspicuous signal is one flashing three times per second, when it is at least twice as bright as its background. (Author's conclusions)

2792
Gerathewohl, S. J.
CONSPICUITY OF FLASHING LIGHT SIGNALS OF DIFFERENT FREQUENCY AND DURATION. — Jour. Exper. Psychol., 48 (4): 247-251. Oct. 1954. DLC (BF1.J6, v. 48)

The experiments reported here have produced evidence that when a subject is engaged in a very complex psychomotor task, and does not know when and where a light signal may appear, its efficacy as a warning or indicator is determined not by the luminance of a singal flash alone, but by the conspicuity of a series of flashes. The results suggest that, if the brightness contrast is 1.00 or 74.20, i. e., according to our previous findings, close to or larger than 1.00, subject will respond to a series of light flashes in a complex situation with about the same speed whether the flash becomes visible only once each second for 1/2 sec., two times for 1/4 sec., or whether it occurs four times per second for only 1/8 sec. At the low contrast, however, the fast flashing light of short duration seems to be more conspicuous than the slow flashing signal of a longer duration. (Author's summary)

2793
Gerathewohl, S. J.
[THE PSYCHOLOGY OF MAN IN AN AIRPLANE] Die Psychologie des Menschen im Flugzeug. — Deutsche Aeronautische Gesellschaft e. V. München: J. A. Barth, 1954. [c1953]. 269 p. In German. DLC (RC1085.G4)

This work examines the current knowledge of basic forms of perception and reaction, sensorimotor coordination, the means and limitation of integration of such complexity of stimuli as encountered in flight, as well as the effect of changes in motion, in altitude, in spatial relationship to earth, in velocity, in acceleration, and the effect of changed phenomenological space referents in

respect to the individual. In the first chapter, the goal of aviation technology is viewed as striving towards a completely automatic operation and control of the aircraft, whereby man would participate only in emergency situations. The author discusses further the aerotechnical concept of man functioning as part of the servomechanism controlling the aircraft, the equipment and instrumentation of the airplane, and the importance of technical aptitude in the pilot, although such aptitude should not be overestimated. Sensory discrimination and reaction processes in flight, orientation as to the position and movement in space, "feel of the airplane", and subjective illusions in blind flying due to false sensory information are investigated in the next chapter. The last chapter describes the chemistry and physics of the atmosphere, and discusses directional orientation in flight, navigation within and outside the atmosphere, the psychophysiology of high altitude flight, the thermal influence, the psychological effects of speed, the psychophysiology of acceleration, and safety measures.

2794
Gerathewohl, S. J.
STUDY OF ACCLIMATIZATION DURING A TWO-WEEK EXPOSURE TO MODERATE ALTITUDE. — Jour. Aviation Med., 25 (2): 156-163. April 1954. DLC (TL555.A1A4, v. 25)

Complex reaction experiments were made at ground level (761 ft.) and at moderate altitude (10,152 ft.) in order to study the effects of mild hypoxia on psychomotor performance, and to find out whether or not acclimatization occurs during a period of thirteen days. The group mean scores of correct responses obtained at the first four altitude tests were consistently lower than the mean scores of the last three pre-altitude tests. The statistical analysis yielded large variations between individuals. This and an inspection of the individual curves revealed characteristic differences in sensitivity to hypoxia. Two of the nine subjects showed a pronounced loss in performance during the whole altitude period. Seven out of the nine test subjects became acclimatized within a period of thirteen days. (Author's summary, modified)

2795
Gerathewohl, S. J.
and H. Strughold
TIME CONSUMPTION OF EYE MOVEMENTS AND HIGH-SPEED FLYING. — Jour. Aviation Med., 25 (1): 38-45. Feb. 1954. DLC (TL555.A1A4, v. 25)

Two types of eye movements were recorded photographically during various ocular performances. These types were (1) saccadic (jerkey) movements of the eyes from one object to another and (2) search movements (saccadic movements without external stimulus). The movements included sweeping the eyes in the four cardinal directions and following geometric patterns which simulated instrument arrangements in aircraft. Data indicated that the angular velocity of eye movement increases with increasing angular extension. Furthermore, the duration of the eye movement depends upon the direction of motion, and there is no practical difference in the angular velocity of the three directions (vertical, horizontal, and diagonal) if the movements are small. However, if the angular extensions are large, then great differentials in time consumption occur. Saccadic eye movements range from 1/10 to 1/5 second in scanning instruments on a C-47 panel and from 105 to 150 milliseconds on an F-80 panel. Examples are given of flying hazards encountered in high-speed aircraft, which might arise from a pilot's lack of knowledge of the time consumed in eye movements.

2796
Geratović, M.
[PSYCHIATRIC PROBLEMS IN AVIATION MEDICINE] Psihijatrijski problemi u vazduhoplovnoj medicini. — Medicinski pregled (Novi Sad), 7 (3): 217-222. 1954. In Serbo-Croatian. DNLM

Earlier methods employed to solve aeromedical problems are contrasted with modern psychiatric concepts of the personality as a psycho-physical whole. The importance of personality characteristics and of case histories and an aid toward reaching decisions on whether or not an individual is fit to fly is stressed. Emotional disturbances encountered in fliers are described and classified in as much as they, too, may serve as indicators of a person's fitness to fly. The author emphasizes the relation of intelligence level to development of manifest seizures of anxiety and to anxiety neuroses. He believes that fliers who survive an accident with concussions, unconsciousness, and subsequent amnesia do not develop manifest anxiety reactions but may in some cases develop a neurasthenic syndrome, or, eventually, an obsessional compensation neurosis. Manifest anxiety reactions develop generally in fliers who survive an accident fully conscious and thus experience an emotional shock. The psychophysical structure is analyzed with special regard to pilot selection. (From the author's summary)

2797

Gerschman, R.,

D. L. Gilbert, S. W. Nye, and W. O. Feen

INFLUENCE OF X-IRRADIATION ON OXYGEN POISONING IN MICE. — Proc. Soc. Exper. Biol. and Med., 86 (1): 27-29. May 1954.

DLC (QP1.S8, v. 86)

The normal survival time of mice in 6 atmospheres of oxygen was about 40 minutes. The average survival times were prolonged 12, 22, 34, and 146 minutes, respectively, when the mice were irradiated with a dose of 8800 r, 30, 48, 72 and 84 hours previously. Anorexia may have contributed to the observed protection. Also, since a significant progressive weight loss was observed in the irradiated animals, experiments are now in progress to determine to what extent protection after irradiation may be due to starvation. (Authors' abstract, modified)

2798

Gerschman, R.,

D. L. Gilbert, S. W. Nye, P. Dwyer, and W. O. Fenn

OXYGEN POISONING AND X-IRRADIATION: A MECHANISM IN COMMON. — Science, 119 (3097): 623-626. May 7, 1954. DLC (Q1.S35, v. 119)

A hypothesis is presented that oxygen poisoning and radiation injury have at least one common basis of action, possibly through the formation of oxidizing free radicals. Pertinent literature data are reviewed, and additional evidence derived from experiments on the protective value of various substances against both oxygen poisoning and radiation effects is reported. (57 references)

2799

Gerschman, R.,

D. L. Gilbert, S. W. Nye, P. W. Nadig, and W. O. Fenn

ROLE OF ADRENALECTOMY AND ADRENAL-CORTICAL HORMONES IN OXYGEN POISONING. — Amer. Jour. Physiol., 178 (2): 346-350. Aug. 1954. DLC (QP1.A5, v. 178)

Adrenalectomy protects rats against high oxygen pressure as evidenced by significantly longer survival times. Administration of either 1.17 mg. of cortisone total dose or of 1.25 ml. of adrenal cortex extract to adrenalectomized rats is enough to counteract the beneficial effect of adrenalectomy. Some evidence was obtained that a total dose of 0.1 mg. of adrenalin/100 g. of body weight alone can also diminish the increased resistance of adrenalectomized rats to high oxygen pressure, but the same dose of adrenalin combined with 1.25 ml. of adrenal cortex extract produced an even greater decrease in survival time. The expected reversal of the effects of adrenalectomy no longer occurs when the adrenal cortical hormones are given in very high unphysiological doses; and paradoxically, there appears to be protection against high oxygen pressure which is even greater than that afforded by adrenalectomy alone. Possible mechanisms that may

offer some explanation of the experiments are discussed. (Authors' summary)

2800
Gerschman, R.,
S. W. Nye, D. L. Gilbert, P. Dwyer, and W. O. Fenn
STUDIES ON OXYGEN POISONING: PROTECTIVE EFFECT OF β-MERCAPTOETHYLAMINE. — Proc. Soc. Exper. Biol. and Med., 85 (1): 75-77. Jan. 1954. DLC (QP1.S8, v. 85)

It has been found that certain chemicals, known to have protective action against X-radiation lethality, also prolong the survival times of animals under oxygen poisoning. In this experiment a group of 20 experimental mice, which received intraperitoneal injections of 3.33 mg. of β-mercaptoethylamine (shown to have protective action against X-radiation) in 0.2 ml. of saline per 20 g. body weight, and a group of 20 control mice, which received equal volumes of saline, were submitted to 6 atmospheres of O_2. The survival times of β-mercaptoethylamine-treated animals were prolonged 70% (average survival time 76.9 ± 2.72 minutes) as compared to the survival times of controls (average survival time 54 ± 1.39 minutes). This protective effect of β-mercaptoethylamine may be due to its role as a component of Coenzyme A, a coenzyme for the pyruvic oxidase system, which shows the greatest sensitivity to increased oxygen tensions. Further oxygen poisoning experiments are planned by the authors using Coenzyme A.

2801
Ghiringhelli, L., 1952
and C. Molina
[CATALASES AND ANOXIC ANOXIA RESULTING FROM WORK DONE IN ANAEROBIOSIS] Catalasi e anossia anossica secondaria a lavoro eseguito in anaerobiosi. — Medicina del lavoro (Milano), 43 (12): 463-467. Dec. 1952. In Italian, with English summary (p. 467). DNLM

The behavior of blood catalase in men suffering from acute hypoxia was studied. The subjects were submitted to exhausting marches of from 10 to 15 minutes on an ergometer. Capillary and venous blood catalase was measured before and after each march. There was no noticeable variation. The authors believe that these negative results might be due to the brevity of the hypoxic condition obtained by the intense work. (Authors' summary, modified)

2802
Ghose, K.
PHYSIOLOGICAL COMPENSATORY MECHANISMS AT ALTITUDE. — Aero Med. Soc. Jour. (New Delhi), 1 (2): 18-27. Oct. 1954. DNLM

This is essentially a critical review of the literature dealing with the effects of anoxia on the human organism. Physical aspects of respiratory gaseous exchange are discussed. Compensatory mechanisms which follow the onset of hyperventilation at altitude are described. Hemotological changes at altitude are discussed in detail, with particular reference to contradictory reports of experimental data.

2803
Gibbs, C. B.
SERVO PRINCIPLES IN SENSORY ORGANIZATION AND THE TRANSFER OF SKILL. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A. P. U. 218/54, July 1954. 12 p. + 4 figures. AD 49 675 UNCLASSIFIED

The paper presents a brief account of biological findings which support the belief that there are essential similarities between the control characteristics of human movement, and those of analogous devices which have been developed, somewhat more recently, by servo engineers. The bearing of these analogies upon the study of the transfer of skill is briefly discussed, by developing a hypothetical servo model of tracking skill and the placing reaction. It is shown that the invariants of the servo model correspond closely with the varieties of a

skilled task between which a trained human operator shows high positive transfer. No or negative transfer of skill is found where two tasks differ in such a way that a servo mechanism designed to discharge the first task would need considerable modification to do the second. The relevance and usefulness of servo models and terminology to the study of the transfer of skill is emphasized, and the practical and theoretical implications are outlined. (Author's summary)

2804

Giersberg, H , and W. Usinger 1952

[THE SIGNIFICANCE OF THE PIGMENT HORMONE IN MAMMALS] Die Bedeutung des Pigmenthormons beim Säugetier. — Naturwissenschaften (Berlin), 39 (17): 405-406. Sept. 1952. In German. DLC (Q3.N7, v. 39)

Experiments with white mice have shown that the pigment hormone [intermedin] has a very pronounced effect on the diurnal rhythm of these animals and that this rhythm is dependent upon the presence of intermedin. After a three-week exposure of white mice to constant illumination the normal diurnal cycle is disrupted. Instead, rest and activity periods, as well as metabolic activity, are evenly distributed throughout the 24-hour period. Administration of intermedin permits the original rhythm to reemerge. White mice were kept under the following experimental conditions: normal day-night conditions, inconstant illumination, in constant darkness, and blinded mice; intermedin not only affected the diurnal rhythm but also had an over-all traquilizing influence. These effects took an extreme form in blinded mice, which under constant illumination exhibited only movements toward ingestion of food. Also some effects on growth and a lowering of the respiratory quotient were noted. It is concluded that intermedin has a vagotonic action and is of importance in the establishment of the diurnal rhythm in mammals and, therefore, also in man.

2805

Gisselson, L.

THE EFFECT OF OXYGEN LACK AND DECREASED BLOOD PRESSURE ON THE MICROPHONIC RESPONSE OF THE COCHLEA: CONSIDERATIONS ON THE NATURE OF THE COCHLEAR POTENTIALS. — Acta otolaryngologica (Stockholm), 44 (2): 101-118. March-April 1954. In English. DNLM

Review of the literature on the effect of oxygen lack and personal experiments on the nature of the cochlear potentials suggested the following conclusions: (1) Cumulative evidence argues strongly for the cochlear potentials being intimately related to the activity of the hair cells; i.e., cochlear potentials can be demonstrated only in the presence of intact hair cells. (2) The amplitude of the cochlear potentials is decreased by oxygen lack as well as by extreme fall in blood pressure. (3) Oxygen lack produced by the administration of potassium cyanide (which inhibits cellular respiration but increases blood pressure) decreases the amplitude of the cochlear potentials, the decrease varying roughly with the degree of anoxia. (4) Oxygen deficiency produced by deprivation of air supply produces an initial decrease in the amplitude of the cochlear potentials and a simultaneous transient slight drop in the blood pressure. After 1-2 min., the blood pressure increases, being accompanied by further decrease in the amplitude of the cochlear potentials. Subsequent supply of oxygen to the animal increases the blood pressure violently and also the amplitude of the cochlear potentials. The blood pressure then gradually drops with a gradual decrease in the amplitude of the cochlear potentials. (5) This biphasic decrease in the amplitude of the cochlear potentials suggests that the potentials are made up of two factors, one sensitive to oxygen lack, the other to changes in blood pressure. (6) The cochlear potentials are extremely sensitive to O_2 lack,

about 30 sec. deprivation of air supply being sufficient to produce a reversible injury to the cochlea, 2 min. deprivation being enough to cause irreparable damage to the organ. (7) Lowering of the blood pressure by the administration of hexamethonium chloride or amyl nitrite does not affect the amplitude of the cochlear potentials, the fall in blood pressure probably not being large enough. (8) There is reason to assume that the cochlear potentials are the expression of a biological effect and not of a piezo-electric or other physical effects. (Author's summary)

2806

Giulio, L., 1952
and G. Geuna

[THE EFFECTS OF RESISTANCE ON THE RESPIRATORY OXYGEN PARADOX PHENOMENON] Azione delle resistenze sul fenomeno paradosso respiratorio da ossigeno. — Bolletino della Società italiana di biologia sperimentale (Napoli), 28 (8-10): 1652-1653. Aug.-Oct. 1952. In Italian. DNLM

The O_2 paradox phenomenon (apnea after breathing pure O_2 or air following the breathing of an O_2-deficient mixture) is examined in relation to the action of respiratory resistance induced by Poiseulle's air stream technique. Subjects exposed to inspiratory resistance and breathing a mixture of 7% O_2 in N_2 showed an increase in the duration of apnea. Subjects breathing a 10% mixture of O_2 in N_2 without inspiratory resistance did not elicit the O_2 phenomenon. Several subjects displayed circulatory reactions (reduced blood pressure, variations in pulse frequency) instead of the O_2 paradox. It is concluded that an O_2-deficient mixture with inspiratory resistance of various degrees (small, medium, large) causes a prolongation of the paradox. An O_2-deficient mixture alone is not sufficient to cause the paradox.

2807

Gleser, G.,
J. Haddock, P. Starr, and G. A. Ulett

PSYCHIATRIC SCREENING OF FLYING PERSONNEL INTERRATER AGREEMENT ON THE BASIS OF PSYCHIATRIC INTERVIEWS. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract 33(038)-13884); issued by School of Aviation Medicine, Randolph Field, Tex. Nov. 1954. 9 p. (Project no. 21-0202-0007, Report no. 10). AD 54 374 PB 116584

This study compares the ratings by two psychiatrists of 117 male students, age 17 to 23, on degree of adjustment and anxiety proneness, after unstructured psychiatric interviews of 1-hour duration, and on their supporting judgments on family, social and cultural factors, symptoms, and personality structure. Considerable lack of agreement was found both in evaluation of current functioning and in prediction of probable future breakdown. Agreement is higher with problem subjects than with normals. Present adjustment ratings show higher agreement than predictions, and histories agree more on objective findings than on interpretations. Individual biases, related to training and doctrinal position, are demonstrated. Possible causes and corrections of unreliability of psychiatric ratings are discussed. (Authors' abstract)

2808

Gobrecht, H., 1953
and H. Oertel

[THE VISUAL PROCESS IN DUSK VISION CONSIDERING THE QUANTUM CHARACTERISTICS OF LIGHT] Der Sehvorgang beim Dämmerungssehen unter Berücksichtigung der Quantennatur des Lichtes. — Zeitschrift für Physik (Berlin), 135 (5): 541-552. Sept. 1953. In German.
DLC (QC1.Z44, v. 135)

An attempt is made to resolve conflicts in the known experimental data on dark-adapted vision by means of a probability equation derived from calculations of the statistical variability of light with regard to the absorption in heterogeneous media.

2809
Gökhan, N., 1953
and H. Winterstein
[THE CHEMICAL REACTION OF THE CEREBROSPINAL FLUID IN HYPOXIA] Die chemische Reaktion der Cerebrospinal-Flüssigkeit im Sauerstoffmangel. — Hoppe-Seyler's Zeitschrift für physiologische Chemie (Berlin), 295: 71-76. Nov. 26, 1953. In German. DLC (QP501.H6, v.295)

Experiments conducted with normal dogs, dogs with extirpated chemoreceptors, and dogs with nonfunctional chemoreceptors under conditions of spontaneous or artificial breathing of a hypoxic air mixture, showed that in all cases the pH of the cerebrospinal fluid shifted toward alkalinity regardless of changes in blood pH. With a few exceptions this alkalosis of the cerebrospinal fluid persisted after the animal was returned to normal air breathing and the blood pH shifted to normal. This phenomenon is explained on the basis of increased blood circulation throughout the brain in hypoxia with correspondingly rapid removal of acid metabolites. The relationship between changes in respiratory minute volume and shifts in pH of the cerebrospinal fluid in hypoxia is discussed.

2810
Goethe, H.
[DISORDERS, SIDE-EFFECTS, AND SEQUELAE IN SEASICKNESS] Erkrankungen, Begleiterscheinungen, und Folgezustände bei Seekrankheit. — Zeitschrift für Tropenmedizin und Parasitologie (Stuttgart), 5 (2): 232-237. April 1954. In German, with English summary (p. 237). DNLM

On the basis of preceding studies and the author's own research, an attempt is made to clarify the relation between seasickness and its so-called "complications". The author presents the viewpoint that ailments commonly designated as such are either separate diseases aggravated or precipitated by seasickness, symptoms accompanying the motion sickness syndrome, or, in rare instances, sequelae such as loss of weight and gastrointestinal disturbances. (Author's summary, modified)

2811
Gogel, W. C.,
R. L. Brune, and K. Inaba
A MODIFICATION OF A STEREOPSIS ADJUSTMENT BY THE EQUIDISTANCE TENDENCY. — Army Medical Research Lab., Fort Knox, Ky. Report no. 157, Nov. 26, 1954. ii+11 p. (AMRL Project no. 6-95-20-001). AD 46 939 UNCLASSIFIED

Using previously determined information in order to maximize certain effects and to reduce others, an experiment was designed to determine whether an equidistance tendency could significantly modify a stereopsis judgment. In two experimental situations, the particular equidistance tendency under consideration was present but opposite in direction and in two control situations it was absent. It was found that as a result of the equidistance tendency the adjustment of one binocular object to apparent distance equality with another binocular object was different, both between an experimental and its appropriate control situation and between the two experimental situations. It is concluded that under the conditions of this experiment the equidistance tendency can appreciably modify a stereopsis judgment. The application of this conclusion to two field situations is discussed. (Authors' summary and conclusions)

2812
Gogel, W. C.
RELATIVE VISUAL DIRECTION AS A FACTOR IN DEPTH PERCEPTION IN COMPLEX SITUATIONS. — Army Medical Research Lab., Fort Knox, Ky. Report no. 148, Nov. 9, 1954. ii+24 p. (AMRL Project 6-95-20-001). AD 51 231 UNCLASSIFIED

An experiment (I) was conducted to illustrate, and also to extend the evidence relating to, two previously formulated hypotheses involving visual direction. The first hypothesis states that a binocular depth illusion will least disturb the perception of the physical depth between a binocular test object of the illusion which has the smallest difference in visual direction from the test object. The second hypothesis states that there is a tendency to see objects as located at the same distance from the observer, with the strength of this tendency being inversely related to the difference between the lateral visual directions of the two objects. These two hypotheses were used to predict the apparent path of movement of a small object attached to the Ames rotating trapezoidal window. An experiment (II) was conducted in which the trapezoidal window was viewed either monocularly or binocularly with four conditions of attaching the small object to the window. The results of Experiment II confirm a variety of predictions made from the two hypotheses. The results from part of Experiment I were generalized and an equation was developed to predict the apparent relative depth position of a binocular object as a function of the apparent relative positions of other binocular objects in the field. (From the author's summary)

2813
Gogel, W. C.
THE TENDENCY TO SEE OBJECTS AS EQUIDISTANT AND ITS INVERSE RELATION TO LATERAL SEPARATION. — Army Medical Research Lab., Fort Knox, Ky. Report no. 146, Oct. 13, 1954. ii+22 p. (AMRL Project no. 6-95-20-001). AD 44 670 UNCLASSIFIED

It was demonstrated quantitatively that there is a tendency for a monocular object to be seen at the same apparent distance as a binocular object. Experimental results indicate that the tendency for objects to appear equidistant decreases as the lateral line-of-sight separation of the objects is increased. This was demonstrated in several visual situations. There is some evidence to suggest that the direction and magnitude of this tendency should be considered as a resultant involving all the objects in the field of view. This tendency seems to be sufficiently strong to modify relative distance perceptions in situations involving size cues. These results were used to "explain" the increase in the effectiveness of size cues with increased lateral separation which was found in that part of a previous study in which one object was viewed binocularly and the other monocularly. (Author's summary)

2814
Gordon, A. S.,
S. J. Piliero, W. Kleinberg, and H. H. Freedman
A PLASMA EXTRACT WITH ERYTHROPOIETIC ACTIVITY. — Proc. Soc. Exper. Biol. and Med., 86 (2): 255-258. June 1954. DLC (QP1.S8, v. 86)

This experiment was performed with reference to the fact that "hemopoietine", a hypothetical erythropoietic factor evoked by anoxia, may be related to the protein-free fraction of plasma, thus increasing the rate of incorporation of amino acids into reticulocyte protein. The effects of the latter substance were tested on the peripheral blood picture and bone marrow of the intact rat. It was found that the administration of an extract prepared from the plasma of severely anemic rats (anemia induced by injection of phenylhydrazine) results in significant increases in peripheral red cell counts, hemoglobin concentration, reticulocyte percentages, hematocrit values, and in concentrations of nucleated erythrocytes within the marrow. The extract exerted significant influence upon the total and differential white cell numbers, the sedimentation rates, and the red cell fragility values. It is concluded that the factor may be related to or identical with the circulating "hemopoietine", hypothesized to be the humoral mediator of anoxia and a fundamental

erythrogenic stimulus. (Authors' summary, modified)

2815
Gordon, D. A.,
J. Zeidner, H. J. Zagorski, and J. E. Uhlaner
VISUAL ACUITY MEASUREMENTS BY WALL CHARTS AND ORTHO-RATER TESTS. — Jour. Applied Psychol., 38 (1): 54-58. Feb. 1954.
DLC (BF1.J55, v. 38)

Essentially the same as item no. 1468, vol. II.

2816
Gordon, M. A.
STABILITY OF FINAL SCHOOL GRADE. — Air Force Personnel and Training Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. Research Bulletin AFPTRC-TR-54-11, April 1954. iii+10 p. (Project no. 7700, Task no. 77006). AD 34 409 UNCLASSIFIED

A method is proposed for assessing the stability of academic grades when they are used as the criteria of success in the validation of aptitude tests. It yields a significance ratio rather than a correlation coefficient and indicates whether the regression of the criterion on the predictor score remains stable throughout a series of graduating classes. The method was applied to data from the Control Tower Operator course. Evidence was obtained for some degree of criterion instability in this course over the period studied. (Author's summary)

2817
Goria, A., 1953
and J. Mallen
[EFFECT OF ALPHA-TOCOPHEROL IN MAN IN CONDITIONS OF ACUTE HYPOXIA] Azione dell'alfa-tocoferolo nell'uomo in condizioni di ipossia acuta. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 152-166. In Italian, with English summary (p. 165). DNLM (W3C0943a)

Alpha tocopherol-treated young adults with acute hypoxia induced by rebreathing a mixture of 7.5% O_2 in N_2 for 3 minutes demonstrated: (1) a slight increase in cardiac frequency; (2) electrocardiographic changes (prolonged period of diastole, slightly modified systolic phase); (3) slight reduction in pulmonary ventilation and an attenuation of the paradoxical phenomena accompanying the first moments the subjects revert to breathing atmospheric air, and (4) a minor O_2 consumption. (31 references).

2818
Goria, A., 1953
and J. Mallen
[REBREATHING OF A MIXTURE WITH A LOW O_2 CONCENTRATION: EFFECTS OF ALPHA TOCOPHEROL ON THE ELECTROCARDIOGRAM] Rirespirazione di miscele a bassa concentrazione di O_2: effetti dell'alfatocoferolo sull'elettrocardiogramma. — Bollettino della Società italiana di biologia sperimentale (Napoli), 29 (6): 1278-1279. June 1953. In Italian. DNLM

A reduction in the duration of various electroencephalographic tracings was demonstrated in hypoxic subjects receiving alpha tocopherol. Modification of P, R, and T potentials was also noted. It is concluded that alpha-tocopherol diminishes the effect of hypoxia on the heart.

2819
Goria, A. 1953
[REBREATHING OF MIXTURES WITH LOW O_2 CONCENTRATION: EFFECT OF ALPHA TOCOPHEROL ON CARDIAC FREQUENCY IN MAN] Rirespirazione di miscele a bassa concentrazione di O_2: effetti nell'uomo, dell' alfatocoferolo sulla frequenza cardiaca. — Bolletino della Società italiana di biologia sperimentale (Napoli), 29 (6): 1275-1976. June 1953. In Italian. DNLM

Cardiac frequency was increased in subjects rendered acutely hypoxic by rebreathing a mixture of 7.5% O_2

in N_2 for 3 minutes, and was sharply decreased after the return to breathing environmental air. Under the same conditions, oral administration of alpha tocopherol produced a slow and gradual decrease in cardiac frequency. It is concluded that alpha tocopheral has a favorable effect on cardiac frequency in acute hypoxia.

2820
Goria, A.

[BEHAVIOR OF THE DIAPHRAGM IN HYPOXIC CONDITIONS] Comportamento del diaframma in condizioni di ipossia. — Bolletino della Società italiana di biologia sperimentale (Napoli), 30 (7): 942-944. July 1954.
In Italian. DNLM

An increase in diaphragmatic activity was exhibited in five subjects exposed to hypoxia by breathing a mixture containing 7.5% O_2 in N_2. This activity decreased progressively over a four minute period due to diaphragmatic fatigue.

2821
Goria, A.

[HYPOXIA AND ESTIMATION OF PASSIVE BODY POSITIONS] Ipossia e valutazione delle posizioni passive del corpo. — Bolletino della Società italiana di biologia sperimentale (Napoli), 30 (12): 1405-1407. Dec. 1954.
In Italian. DNLM

Normal subjects inclined at various angles were asked to estimate their body position. In the vertical position the error in estimation was 2°-20°; in the horizontal position the error amounted to 15°-20°. In hypoxic subjects under the same conditions, the error in estimation was 5°-30° in the vertical position, and 2°-12° error in the horizontal position. When inclined at a 45° angle, the error in estimation of body position by normal subjects was 15° and in hypoxic subjects 25°.

2822
Gorlin, R.,
and B. M. Lewis

CIRCULATORY ADJUSTMENTS TO HYPOXIA IN DOGS. — Jour. Applied Physiol., 7 (2): 180-185. Sept. 1954.
DLC (QP1.J72, v. 7)

Twenty-eight sets of observations were made on 11 dogs which were subjected to varying degrees of hypoxia. While many variables exist, such as the health and nutrition of each dog and the depth of anesthesia, certain cardiovascular effects seem related to the degree and duration of hypoxia. With arterial oxygen saturations down to about 60%, the only effects are on vascular resistance. There is an immediate systemic vasoconstriction and hypertension and with time a gradually incremental pulmonary vasoconstriction, and no change in cardiac output. When the saturation is less than 60% but greater than 40%, cardiac work and output increase, and despite prolonged exposure to hypoxia, cardiac function remains normal up to 8 hours. Systemic hypertension persists, but vasodilatation occurs nevertheless here and in the pulmonary circuit. When the saturation falls much below 40%, cardiac work and output are greatly increased and, except for the first few minutes, always in the presence of an elevated ventricular diastolic filling pressure. With severe hypoxemia (below 20%) this state can be maintained for a varying, but usually short period of time, since coronary blood flow cannot supply the necessary oxygen. Oxygen lack accumulates, oxidative energy production eventually decreases, and cardiac contraction deteriorates. Throughout, a systemic hypertension is maintained. (Authors' conclusions)

2823
Grandjean, E.

THE EFFECT OF ALTITUDE UPON VARIOUS NERVOUS FUNCTIONS. — Proc. Roy. Soc. (London), 143 (910): 12-13. Dec. 1954.
DLC (Q41. L7, v. 143)

The effects of residence at altitudes upon the nervous functions of healthy normal subjects were studied

during several expeditions to the Jungfraujoch (3450 m.). Lowered thresholds were observed of cutaneous, corneal, gustatory and knee-jerk reflex sensitivities during a 2- to 3-week stay at that altitude, returning to normal after return to the plain. Also increased visual sensitivity, and constriction of the pupil were noted, interpreted as resulting from increased retinal sensitivity. The amplitude of equilibratory movements showed a tendency to decrease during the stay at the Jungfraujoch. These findings indicate a stimulation of the sensory organs and reflex activity of various nervous functions at an altitude of 3400 m. contrary to a depressive effect reported by others at higher altitudes. The author concludes that the central nervous system is first stimulated at least up to an altitude of 3500 m. and then depressed at higher altitudes. The stimulation of the sense organs and of some functions of the central nervous system have been interpreted as an "ergotropic' regulation of the autonomic nervous system with an increased sympathetic activity. The increased heart rate, the increased cardiac output, the augmentation of the circulating blood volume, and various other modifications during the adaptation of the human organism to altitude are connected with an increased sympathetic activity. The observed stimulation of nervous functions might therefore be the result of a general emergency reaction of the autonomic nervous system, which regulates the adaptation of the human body to the first degrees of oxygen lack.

2824

Grandpierre, R. 1953

[THE PHYSICAL TRAINING OF FLYING PERSONNEL: HISTORICAL OUTLINE] L'entrainement physique du personnel navigant: aperçu historique. — Forces aériennes françaises (Paris), no. 81: 312-319. June 1953. In French.

DLC (UG635.F8F66, no. 81)

The need for superior physical qualities in coping with the special problems encountered in flying is emphasized. Since World War I it has been recognized that qualities of endurance, equilibrium, speed, and precision, as well as moral qualities of group spirit, courage and self-discipline, are best developed by athletics. Some contributions to the development of this concept are discussed.

2825

Grandpierre, R.,
C. Franck, P. Arnould, and P. Bouverot

[ACTION OF HYPOCAPNIC ANOXEMIA ON THE VASOMOTOR EFFECT OF NORADRENALIN] Action de l'anoxémie hypocapnique sur l'effet vasomoteur de la noradrénaline. — Comptes rendus de la Société de biologie (Paris), 148 (15-18): 1470-1471. Aug.-Sept. 1954. In French.

DLC (QP1.S7, v. 148)

Respiratory and carotid pressures were recorded following the intravenous administration of norepinephrine or epinephrine to dogs and rabbits. The animals were made anoxemic by breathing oxygen-deficient gas mixtures. In both animals hypocapnic anoxemia caused a reduction of the vasoconstrictor effect induced by norepinephrine and epinephrine.

2826

Grandpierre, R.,
and C. Franck

[CIRCULATORY EFFECTS OF PRESSURE BREATHING] Effets circulatoires de la respiration sous pression. — Médecine aéronautique (Paris), 9 (3): 275-278. 1954. In French.

DLC (TL555.M394, v. 9)

In anesthetized dogs, respiration under pressure (20 cm. H_2O) was followed by an immediate decrease in arterial pressure. The rate of decrease was directly proportional to the rapidity with which pressure breathing was applied. On the other hand, when 25 human volunteers were

subjected to pressure breathing, it was found that the reactions varied. Four distinct groups could be established: (1) those showing immediate hypotension of several cm. Hg lasting for the entire duration of the imposed pressure (11 subjects); (2) those showing immediate hypertension of three to four cm. of Hg followed by a slight decrease after 2 minutes (9 subjects, mostly older than 35 years); (3) those showing immediate hypotension followed by an increase in pressure to its initial level (3 subjects, aged 20-25 years); and (4) those showing no reaction (2 subjects).

2827
Grandpierre, R.,
F. Violette, and P. Foulhoux
[MODIFICATIONS OF THE ARTERIAL PRESSURE IN MAN DURING HIGH PRESSURE RESPIRATION] Modifications de la pression artérielle chez l'homme au cours de la respiration en suppression. — Médecine aéronautique (Paris), 9 (1): 75-76. 1954. In French. DLC (TL555.M394, v. 9)

The arterial pressures of a group of men subjected to pressure breathing were measured. Responses differed markedly as follows: (1) immediate hypotension; (2) immediate hypertension; (3) slight hypertension after a brief period of hypotension; and (4) no modifications in arterial pressure. It was noted in addition that subjects showing immediate hypotension tolerated high pressures better than those showing immediate hypertension. It is suggested that tests determining the changes in arterial pressure during pressure breathing be utilized for flight personnel selection purposes.

2828
Grandpierre, R.,
and C. Franck
[SOME RECENT STUDIES ON HYPEROXIA] Quelques recherches récentes sur l'hyperoxie. — Concours médical (Paris), 76 (25): 2491-2493. June 19, 1954. In French. DNLM

A brief review of previous studies of the phenomena associated with the inhalation of pure oxygen is presented. Experiments were conducted in an attempt to confirm the studies and to examine the mechanism of production of the phenomena observed. Bronchoconstriction, slowing of respiration, bradycardia, retention of carbon dioxide in the venous blood, and pulmonary lesions were studied. Observations suggested that the elevation of the oxygen level in the blood probably caused the depression of the respiratory centers and subsequent slowing of respiration, as well as retention of carbon dioxide in the tissues. In studies of pulmonary lesions, their appearance was noted not only after inhalation of pure oxygen, but also upon introduction of oxygen by other means (e.g intrarectal). Injection of cortisone and ACTH aggravated the lesions, while injection of paroxyproprione decreased their frequency of appearance. Thus the pituitary and adrenal glands were shown to be involved in the production of lesions. Further researches of therapeutic import are expected.

2829
Grandpierre, R.,
P. Grognot, and J. Chomé
[REACTIONS OF THE CEREBRAL CORTEX TO ULTRASONIC VIBRATIONS SIMILAR TO THOSE PRODUCED BY AIRPLANE PROPELLERS] Réactions du cortex cérébral à des vibrations ultra-sonores analogues à celles produites par les propulseurs d'avions. — Médecine aéronautique (Paris), 9 (4): 469-474. 1954. In French. DLC (TL555.M394, v. 9)

Propeller-driven airplanes of modern design emit ultrasonic vibrations at frequencies from 22,000 to 25,000 c.p.s. and of intensities between 80 and 115 db. Laboratory experiments were carried out on animals and human subjects to determine the physiological effects of these vibrations. A Hartmann whistle emitting a pure ultrasound of 22,000 c.p.s. at 110 db., and

a siren producing vibrations of 25,000 c.p.s. (between 115 and 175 db.) were used. In the animals (including a rat, a guinea pig, and a rabbit) cellular lesions in the motor cortex, the caudate nucleus, and the cerebellum causing disturbances of equilibrium and coordination were observed. When human subjects were exposed to vibrations 600 times less in intensity, a 30-50% increase in the eosinophil level was determined in the blood of almost 90% of the subjects. In other subjects a decrease in blood pressure of about 15 mm. Hg was observed. These changes were attributed to similar effects on the brain. Distinct changes in electroencephalograms were recorded.

2830
Grandpierre, R.,
C. Franck, and P. Bouverot
[CAN ELECTRO-PHRENIC RESPIRATION BE APPLIED SUCCESSFULLY IN THE TREATMENT OF ANOXEMIC SYNCOPE?] La respiration électrophrénique est-elle utilisable dans le traitement de la syncope anoxémique?— Médecine aéronautique (Paris), 9 (1): 77-78. 1954. In French.
DLC (TL555.M394, v. 9)

Anoxemic syncope was provoked in dogs by inhalation of a gaseous mixture containing 1 to 3% oxygen in nitrogen. In cases where normal cardiovascular functions were impeded, electro-phrenic stimulation brought about the revival of the animals even when air not enriched with excess oxygen was inhaled. In cases where there was cardiovascular failure, but the heart was still beating, it was possible to revive the animal by electro-phrenic stimulation coupled with inhalation of pure oxygen. In cases where the heart stopped beating, however, it was impossible to revive the animals solely by oxygenation and electro-phrenic stimulation.

2831
Grandpierre, R.,
C. Franck, and L. Tabusse
[PHARMACO-DYNAMIC SUBSTANCES THE USE OF WHICH IS CONTRA-INDICATED FOR FLIGHT PERSONNEL] Substances pharmacodynamiques dont l'emploi est contre-indiqué pour le personnel navigant. — Médecine aéronautique (Paris), 9 (4): 349-376. 1954. In French. DLC (TL555.M394, v.9)

A considerable number of drugs which do not show any adverse effects under normal conditions on the ground, may be contraindicated in the case of air personnel during flight. A review is presented of drugs and medications which may adversely affect resistance to anoxemia, to acceleration, cold, and to depression, or which may interfere with mental and sensory functions and reduce general resistance in flight personnel. (118 references)

2832
Grandpierre, R.,
and P. Grognot
[ON THE MECHANISM OF PRODUCTION OF PULMONARY LESIONS INDUCED BY THE INHALATION OF PURE OXYGEN] Sur le mécanisme de production des lésions pulmonaires provoquées par l'inhalation d'oxygène pur. — Journal de physiologie (Paris), 46 (1): 375-377. 1954. In French.
DNLM

Lungs from guinea pigs breathing pure O_2 (98%) for 7-9 hours showed basal lesions near the bronchi and in the sub-pleural areas. After short-term O_2 inhalation, alveolar wall thinness and alveolar compression were visible, along with congestion of hematosed capillaries and rare hemorrhage caused by erythrodiapedesis. In order to study the role of hormones in the mechanism of these lesions, ACTH and cortisone were administered intramuscularly 30 minutes prior to the experiment. Pulmonary lesions increased and were characterized by turgescence of capillary endothelial nuclei and the escape of plasma into the intracellular spaces, causing edema, without passage into the alveolar aperture. No hemorrhage or vas-

cular congestion was observed. In addition, the role of the autonomic nervous system in the production of pulmonary lesions was studied by administering chlorpromazine one half hour prior to oxygen inhalation. No lung damage was observed. The authors conclude that ACTH and cortisone aggravate pulmonary lesions caused by the inhalation of pure O_2, whereas chlorpromazine exhibits a protective action against pulmonary damage.

2833
Grandpierre, R.

[TWENTY-SECOND CONVENTION OF THE ASSOCIATION OF FRENCH-SPEAKING PHYSIOLOGISTS] 22e réunion de l'Association des Physiologistes de Langue française. — Médecine aéronautique (Paris), 9 (3): 326-328. 1954. In French.
DLC (TL555.M394, v. 9)

Papers dealing with subjects of aviation physiology, presented at the 22nd meeting of the French-Language Association of Physiologists held in Lille, France, from June 9th to 11th, 1954 are reviewed. The proceedings of the meeting are published in Journal de physiologie (Paris), 46 (1), 1954.

2834
Grandpierre, R.,
C. Franck, and O. Olsen

[UTILIZATION OF THE TAP TEST AND THE FLICKER FUSION TEST IN THE CONTROL OF FATIGUE IN FLIGHT PERSONNEL] Utilisation du tap-test et du test de scintillement pour le contrôle de la fatigue du personnel navigant de l'aviation. — Médecine aéronautique (Paris), 9 (1): 79-80. 1954. In French. DLC (TL555.M394, v. 9)

Two methods providing valuable information on fatigue in flight personnel were studied. Flicker fusion frequency (FFF) tests carried out on eleven subjects led to the following results: (1) FFF values remained constant in a particular subject under the same experimental conditions. (2) Lower FFF's were observed after performance of work in 9 of the 11 subjects. (3) FFF values increased in all cases in binocular vision as compared to monocular vision. And (4), immediately following a work task requiring definite attention, an increase in FFF was observed followed, five minutes later, by a net decrease. Tests carried out on 23 subjects to determine the maximum rate of repetition of voluntary movements (tapping test) with the use of a telegraphic key, showed the following: (1) Results for a given individual under the same conditions were relatively constant. (2) In subjects performing mental working tasks, the number of taps increased generally at the end of the working period. (3) In all the subjects there was a decrease in taps following muscular exertion. (4) In the right-handed persons, fatigue affected primarily the left hand, and vice versa. And (5) in 5 pilots, after an hour's flight, the number of taps increased greatly immediately upon dismounting from the plane and decreased throughout the following hour. It is concluded that, in view of the fact that both tests give results which are relatively constant for the same individual under the same conditions, they ought to permit precise determination of fatigue in pilots in conjunction with other functional tests.

2835
Grandpierre, R.,
C. Franck, and F. Violette

[VARIATIONS OF THE ARTERIAL PRESSURE IN MAN CAUSED BY BREATHING UNDER PRESSURE] Variations de la pression artérielle provoquées chez l'homme par la respiration sous pression. — Comptes rendus de la Societé de biologie (Paris), 148 (5-6): 563-564. March 1954. In French. DLC (QP1.S7, v. 148)

Twenty-five volunteers 20 to 40 years of age breathed air at a pressure of 20 to 30 cm. water. Their responses could be grouped into four classes: (1) 11 subjects with hypotension maintained it during the experiments; (2) 9 subjects with hyper-

tension of 3 to 4 cm. Hg showed a slight blood pressure reduction; (3) 3 subjects who showed a hypotension at the beginning of the experiments returned to the original blood pressure level; and (4) 2 subjects showed no blood pressure reaction. The mechanism of the observed circulatory phenomena may be explained by the fact that the tolerance to pressure breathing is related to the capacity of both cardiac and vasomotor adjustments. Younger individuals achieved compensation more by cardiac than older ones by vasomotor action.

2836
Granger, G. W.
EFFECT OF EPHEDRINE ON DARK VISION. — Nature (London), 174 (4431): 653-654. Oct. 2, 1954.
DLC (Q1.N2, v. 174)

In connection with contradictory hypotheses on the influence of the sympathetic nervous system on dark adaptation, the effect of ephedrine on night vision was tested in four subjects. Four tests were administered to each subject on four consecutive days: (1) control test, (2) test of dark vision administered 1 hour after oral intake of 1 g. ephedrine, (3) test 1 1/2 hours after oral ephedrine, and (4) test after administration of a placebo. The resulting data were submitted to an analysis of variance, which showed clearly that the drug treatment had no significant effect on dark-vision. These findings are discussed in relation to previous studies.

2837
Graybiel, A.
AEROMETEORISM: A NEW HAZARD. — Naval School of Aviation Medicine, Pensacola, Fla. July 8, 1954. 3+3 p. (Project report no. NM 001 058.25.17). AD 41 468 UNCLASSIFIED
Also published as: AEROMETEORISM. — Jour. Aviation Med., 25 (6): 664-666, 679. Dec. 1954.
DLC (TL555.A1A4, v. 25)

Falling aircraft and fragments or contents of aircraft may properly be termed aerometeorites and the damage or injury they cause, aerometeorism. Persons most liable to injury are those who work at aviational facilities, live in close proximity to airports, and those who are spectators at air shows, exhibitions, or the like. There is a record of 235 deaths and 807 injuries in recent years. This hazard is no longer negligible. (Author's summary)

2838
Graybiel, A.
THE CONCEPT OF AVIATION MEDICINE. — Naval School of Aviation Medicine, Pensacola, Fla. Sept. 10, 1954. 10+4 p. (Project Report no. NM 001 058.25.18). AD 42 899
UNCLASSIFIED
Also published in: Jour. Aviation Med., 25 (5): 504-514, 522. Oct. 1954.
DLC (TL55.A1A4, v. 25)

Two major divisions of aviation activity exist: aerotransportation and aeromission. Some of the more important considerations of aerotransportation, which is concerned with the successful flight from one airport to another, are: the selection, training, and care of all personnel involved in the flight, especially the pilot; the proper maintenance of the plane; the efficient operation of those facilities which support the flight, such as, communications, aviational aids, and airport installations, together with adequate provisions for the medical examination and care of personnel; integration of operations between various air transport systems; and representation by aviation medical specialists on policy-making boards. The aeromission has another objective in addition to transportation from one locale to another; here the flight is a means to an end. The considerations involved are: personnel, again the pilot is of prime importance; the plane and its proper operation; the function of the weapons; bases and facilities, chain of command, and operational activities. The aeromission in the connotation of combat mission is directly dependent

on the actual sortie, the pertinent preparations, and ground support.

2839
Graybiel, A.
FLYING STRESS AND HEART DISEASE IN U. S. NAVAL AVIATORS. — Naval School of Aviation Medicine, Pensacola, Fla. Research Report no. NM 001 059.06.10, Oct. 12, 1954. ii+ 12 p. AD 61 400 UNCLASSIFIED

A study of flying stress and its relation to heart disease in naval aviators indicates that these aviators are, if anything, less susceptible to hypertensive and coronary heart disease than are non-flying officers. The existence of flying stress is not denied; however, short periods of stress are followed by long periods during which recovery from strain can take place. For this report aviators were regarded as a single occupational group and the inquiry centered around (1) experiences in the Cardiac Clinic at the U. S. Naval School of Aviation Medicine; (2) the results of a 12 year follow-up study of 1056 naval aviators, and (3) a comparison of the incidence of heart disease in flying and non-flying naval officers. (Author's abstract)

2840
Graybiel, A.,
and J. L. Patterson
THRESHOLDS OF STIMULATION OF THE OTOLITH ORGANS AS INDICATED BY THE OCULOGRAVIC ILLUSION. — Naval School of Aviation Medicine, Pensacola, Fla. July 26, 1954. 6+5 p. (Project Report no. NM 001 059.01.38). AD 44 402 UNCLASSIFIED

The oculogravic illusion was utilized as an indicator mechanism in determining thresholds of perception to a change in direction of resultant force. The mean threshold in the sitting position was 0.000344 g ($\Theta = 1.5$ degrees) for the 75% correct response level. The corresponding threshold values with the subjects lying on the right side were 8.9 degrees. Thresholds were unobtainable with the subjects in the upside down position. (Naval School of Aviation Medicine abstract)

2841
Greenfield, A. D. M.,
D. M. Kerslake, and G. C. Patterson
PROLONGED DILATATION OF THE FOREARM BLOOD VESSELS AFTER A LARGE INCREASE IN TRANSMURAL PRESSURE (Abstract). — Jour. Physiol. (London), 125 (1): 40P-41P. July 28, 1954. DLC (QP1.J75, v. 125)

An increase in transmural pressure of the arm blood vessels can be produced by reducing the atmospheric pressure on the arm and leaving that on the remainder of the body unchanged, or by leaving the atmospheric pressure on the arm unchanged and raising that on the remainder of the body. The former method may, but the latter cannot, cause aeroembolism. A prolonged vasodilatation has been demonstrated by the latter method after exposure to 140 or 186 mm. Hg differential pressure, but not after 95 mm. Hg. The subject was seated in a pressure tank with his left arm projecting through a hole in the wall; a rubber sleeve attached to the hole tightened on to the arm and made an airtight seal when the pressure in the tank was raised. The blood flow through both forearms was measured with venous occlusion plethysmographs before and after the pressure on the subject had been raised for 1 min. above the constant pressure on the left arm. (Quoted in part)

2842
Gregg, L. W.
THE EFFECT OF STIMULUS COMPLEXITY ON DISCRIMINATIVE RESPONSES. — Jour. Exper. Psychol., 48 (4): 289-297. Oct. 1954. DLC (BF1.J6, v. 48)

A technique for quantifying stimulus aspects of discrimination tasks was presented. In addition, the nature of

changes in proficiency of performance of discriminative responses to varying visual stimuli was investigated. Visual stimuli used varied in horizontal spatial separation, vertical spatial separation, size, and brightness. The motor responses were right or left movements of a joy-stick control. Four groups of 24 subjects each were used. The results of the analyses of the reaction time data showed that reaction time during acquisition decreased at approximately the same rate and to the same extent for all groups. An asymptotic reaction time level was reached within the acquisition trials. The overall group reaction time levels were different. The group in which the horizontal spatial discrimination was associated with the right-left movements showed the lowest overall reaction time. Next was the group in which the vertical spatial discrimination was associated with the right-left movements. The other two groups, in which the size and brightness discrimination were associated with the right-left movements, has still higher mean reaction times, but did not differ significantly between themselves. Reaction time was found to increase as the scale of values of stimulus complexity increased The relationship was essentially linear, but the exact nature of the function was somewhat different for the different groups. Analyses of the error data yielded similar results. (Author's summary, modified)

2843
Griffis, L. E.
WINTER WARFARE. — Combat Crew, 5 (6): 3. Dec. 1954. DLC

The individual airman's responsibility for maintaining his own health in conditions of weather confronted during winter is discussed. The dangers of flying with a cold or after the unsupervised use of drugs, and the need for proper clothing are stressed.

2844
Groesbeck, B. 1953
MEDICINE AND AVIATION. — Med. Annals District of Columbia, 22 (2): 79-84. Feb. 1953.
DLC (R11.M515, v. 22)

Aviation medicine is discussed in an address to medical students dealing with accomplishments in fields other than the actual practice of medicine. Specifically, it is noted that modern high-speed and high-altitude aircraft have been made possible only through medical research in such fields as effects of anoxia, decompression, acceleration, and special physical requirements of personnel, such as oxygen supply.

2845
Grognot, P. [A.], and J. Chomé
[THE ACTION OF CHLORPROMAZINE AND TETRAETHYLAMMONIUM ON THE PULMONARY REACTIONS INDUCED BY THE INHALATION OF PURE OXYGEN] Action de la chlorpromazine et du tetrylammonium sur les réactions pulmonaires provoquées par inhalation d'oxygène pur. — Comptes rendus la Société de biologie (Paris), 148 (15-16 and 17-18): 1474-1475. Aug.-Sept. 1954. In French.
DLC (QP1.S7, v. 148)

An experiment was conducted to determine the role of the nervous system in producing the pulmonary congestive and hemmorhagic effects associated with prolonged inhalation of pure oxygen. Guinea pigs were injected with varying amounts of chlorpromazine or tetraethylammonium bromide (two inhibitors of the neurovegetative system) and exposed to an atmosphere of pure oxygen for more than six hours. The animals were then sacrificed and examined. Both groups showed a progressive protection from pulmonary damage with increasing doses of the drugs. Those treated with chlorpromazine showed no congestion or hemmorhage at an effective dose level, and those treated with tetraethylammonium only slight congestion with no hemorrhage. Thus the damaging effects of the inhalation

of pure oxygen were shown to be related to the functioning of the nervous system.

2846
Grognot, P. A.,
and P. L. Biget
[ON THE MECHANISM OF CERTAIN ULTRASONIC VIBRATIONS TRANSMITTED THROUGH THE AIR] A propos du mécanisme d'action de certaines vibrations ultra-sonores transmises dans l'air. — Médecine aéronautique (Paris), 9 (1): 78. 1954. In French.
DLC (TL555.M394, v. 9)

The theory held by many researchers that ultrasonic vibrations cause tissue damage in man and death in animals because of progressive heating of the tissues is disputed. Experimental animals were exposed to a flux of warm air, which finally attained a temperature of 115° C. for a period of time equal to the time utilized in experiments employing ultrasonic vibrations. The findings were as follows: (1) rectal temperatures reached 43°, but the animals did not die. (2) The number of eosinophils was decreased by 50%. (3) The albumin fraction decreased substantially but there was little change in globulin fractions. Opposite results were obtained when the same animals were exposed to ultrasonic vibrations. It is concluded that lethal effects of ultrasonic vibrations cannot be attributed solely to rise in tissue temperatures.

2847
Grognot, P. A.
[INFRASONIC SPECTRA EMITTED BY THE PROPELLERS OF MODERN AIRPLANES] Spectres infra-sonores émis par les propulseurs d'avions modernes. — Médecine aéronautique (Paris), 9 (4): 477-482. 1954. In French. DLC (TL555.M394, v. 9)

The emissions of infrasonic vibrations by propeller-driven and jet-engine planes and helicopters, on the ground, in flight, and during take-off and landing were measured and analyzed. These vibrations transmitted through the air may reach intensities up to 126 decibels (measured at a distance of 200 meters from the aircraft). Physio-pathological studies have shown that vibrations of the order of 32 c.p.s. provoke a resonance in the hollow organs of the human body, in particular, the thorax and the digestive tract. This may result in neuro-vegetative disturbances (nausea, vomiting) causing considerable discomfort.

2848
Gronow, D. G. C.
A STUDY OF THE SAFETY OF BACKWARD-FACING AND FORWARD-FACING PASSENGER SEATS IN ACCIDENTS INVOLVING RAF TRANSPORT COMMAND AIRCRAFT. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 870, March 1954. 13 p. TIP U72437 UNCLASSIFIED

Accidents to Dakota, York, Valetta, and Hastings aircraft of the RAF Transport Command have been studied for the period 1946 to 1955. Major accident rates have been discussed for the complete series and also for a specially selected sub-series. The selected sub-series has included only those accidents having a direct bearing on the question of passenger safety. Crew casualties were used as an index of the severity of an accident, in addition to the information as to whether the aircraft was destroyed or merely substantially damaged. Little difference was found in the crew casualty rates for the forward-seating Dakotas and Yorks and the backward-seating Valettas and Hastings. Passenger casualty rates, however, showed that killed and seriously passengers were 21.6% of those carried by Dakota and York aircraft, while only 6.4% were in this category in the Valetta and Hastings aircraft. It is concluded that the risk of serious injury to passengers is less with the backward facing seats. (Author's summary, modified)

2849
Gruber, H. E.
THE RELATION OF PERCEIVED SIZE TO PERCEIVED DISTANCE. — Amer. Jour. Psychol., 67 (3): 411-426. Sept. 1954. DLC (BF1.A5, v. 67)

Two experiments were conducted, with a total of 51 observers, to test the hypothesis that perceived size is proportional to perceived distance when image size is held constant. Three major facts emerged from the results: (1) an object which was consistently underestimated in relative size was consistently overestimated in relative distance; (2) over a range of distances from 200 cm. to 450 cm., the mean constant error in relative-size judgments rose steadily from 4% to 23%, whereas the mean constant error in relative-distance judgments, rather than varying systematically with the standard distance, fluctuated around 17%, and (3) analysis of individual differences revealed no correlation between size and distance judgments. All three results are contrary to hypothesis. An alternative theoretical scheme was suggested in which perceived size and perceived distance do not depend on each other. Instead, both emerge from a common matrix of ongoing stimulus processes and memory traces; but they may be related to that matrix in different ways. (From the author's summary)

2850
Gubler, E. V.
[THERMOREGULATION IN ANOXIA: EFFECTS OF GENERAL COOLING ON THE COURSE OF ANOXIA IN CATS] O teploreguliatsii pri kislorodnom golodanii: Vliianie obshchego okhlazhdeniia na techenie kislorodnogo golodaniia u koshek. — Biulletin' eksperimental'noĭ biologii i meditsiny (Moskva), 37 (2): 34. Feb. 1954. In Russian. DLC (R91.B56, v. 37)

E. A. Kartashevskiĭ claimed in 1908 that under conditions of anoxia dogs eliminated a considerable amount of heat which resulted in the development of hypothermia accompanied by an increased rate of oxygen consumption and a fall in the animal's resistance to oxygen deficiency. The author, following the general plan of Kartashevskiĭ's experimental procedures, found that sleep under conditions of deep hypothermia heightened considerably the resistance of cats to oxygen deficiency and that it was not accompanied by any kind of irreversible changes in the organism. In fact, such a condition usually was followed by a rapid return to normal physiological behavior. The author applied different methods of cooling and different conditions of atmospheric pressure reduction. In no case did he find any signs of reduction in the cats' resistance to oxygen insufficiency in the inhaled air, such as was observed by Kartashevskiĭ in his dogs. In fact, the cats' resistance to conditions of oxygen deficiency increased. The experimental conditions of oxygen insufficiency were admittedly more severe than those which prevailed in Kartashevskiĭ's experiments. The results are interpreted to indicate that severe artificial hypothermia in the presence of anoxia while profoundly inhibiting the thermoregulating mechanism, can be accompanied by an increase in resistance to oxygen insufficiency, in rodents as well as in animals with a more highly developed thermoregulatory system.

2851
Guedry, F. E. 1953
THE RETENTION OF EFFECTS OF 'MASSED' AND 'DISTRIBUTED' VESTIBULAR STIMULATION AS INDICATED BY THE DURATION OF THE OCULOGYRAL ILLUSION. — Tulane Univ., New Orleans, La. (Contract N7-onr-434, Task Order I); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NR 143-455). Joint Project Report no. 33, July 1, 1953. 20 p. AD 17 532 UNCLASSIFIED

An investigation was made of the effects of a 'massed' and a 'distributed' rotation series on two aspects

of habituation: (1) the decrement in response duration with the habituation series, and (2) the retention of habituation. Following preliminary indoctrination, two groups of 10 subjects received 39 separate rotation trials in which the rotational and postrotational durations of the oculogyral illusion were reported. This series of trials, which constituted the habituation series, was 'massed' into a single period with one group, while, with the other group, it was 'distributed' over four half-hour, daily sessions. Tests of retention were made seven days after completion of the habituation series. Within the limits of this experiment, the response decrement produced by a 'massed' series is at least as great as that yielded by a 'distributed' series. However if there is a systematic difference in the retention produced by these two series, it is the 'distributed' series which yields the greater retention. An interesting inference which arises as a by-product of the experimental procedure is that visual stimulation has an habituatory effect which is specific to the directional component of the vestibular reaction in progress when the visual stimulation is introduced. Otherwise expressed, the habituatory effect of visual stimulation does not generalize to a vestibular stimulus with an opposite directional component (Author's summary)

2852
Guedry, F. E.,
and J. I. Niven
INTERACTION OF VESTIBULAR STIMULI OF DIFFERENT MAGNITUDES AND OPPOSITE DIRECTIONS. PART I. PERCEPTION OF VISUAL APPARENT MOTION DURING ANGULAR ACCELERATIONS. — Tulane Univ., New Orleans, La. (Contract N7onr-434, Task Order I); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 063.01.36). Joint Project Report no. 36, Dec. 8, 1954. ii+13+1p. AD 61 451 PB 117 615

Three subjects were accelerated to a predetermined level and then braked to a stop to produce positive and negative angular accelerations in quick succession. They reported on the direction and duration of apparent motion of a visual target. The data obtained were in agreement with theoretical equations which had been derived from the standard differential equation for a torsion pendulum. The data showed a high degree of consistency between subjects and within subjects. The striking similarity between theoretical and experimental data tends to confirm the validity of the torsion pendulum analogy for semicircular canal function.

2853
Gugenheim, C.
[EXPERIMENTAL STUDY OF THE OBJECTIVE AND SUBJECTIVE ASPECTS OF FATIGUE DURING MONOTONOUS WORK. I. RESEARCH ON A GROUP OF STUDENTS] Étude expérimentale des aspects objectifs et subjectifs de la fatigue pendant un travail monotone. I. Recherche effectuée sur un groupe d'étudiants — Travail humain (Paris), 16 (3-4): 219-240. July-Dec. 1953. In French. DLC (T58.A2T7, v. 16)

Twenty-five students were subjected to monotonous, free-rhythm work requiring minimal muscular effort but constant attention. Fatigue, job performance and accuracy were recorded. The subjects were grouped according to those showing no modification in the amount and quality of work; those with increased performance but irregularity in accuracy; and those with poor and irregular results and subsequent discontinuance of work. The author concludes that (1) subjective and objective characteristics of fatigue may not be related; (2) increased performance with increasing irregularity in accuracy may accompany fatigue; (3) irregularity in accuracy or performance or both are characteristic of behavior in subjects executing monotonous, free-rhythm work requiring constant attention when fatigued.

2854
Guilford, J. P.,
P. R. Christensen, N. W. Kettner, R. F. Green, and A. F. Hertzka
A FACTOR-ANALYTIC STUDY OF NAVY REASONING TESTS WITH THE AIR FORCE AIRCREW CLASSIFICATION BATTERY. — Educational and Psychol. Measurement, 14 (2): 301-325. Summer 1954. DLC (BF1.E3, v. 14)

A battery of 32 experimental tests and 22 Air Force Classification tests was administered to Air Cadets and Student Officers in pilot training. Tetrachoric correlations were computed between the 54 dichotomized score distributions for a sample of 395 Air Cadets and 343 Student Officers. Sixteen factors were extracted using Tucker's adaptation of Hotelling's iterative procedure for determining principal components. The Zimmerman graphic, orthogonal method was used in rotating the axes. Of the factors identified, the following four are considered to be in the domain of reasoning: (1) general reasoning, (2) education of correlates, (3) education of perceptual relations, and (4) education of conceptual relations. Only the first one is present in the Aircrew Classification Battery. Of the remaining twelve factors, the following five factors only were common to the experimental and the Air Force Classification tests: (1) verbal comprehension, (2) perceptual speed, (3) visualization, (4) judgment, and (5) attention to perceptual detail. In view of this, the authors suggest that the addition to the Aircrew Classification Battery of tests patterned after some of the experimental tests may increase validity in selection and classification operations. Authors' summary, modified)

2855
Gulîaev, P. I.
[PARABIOTIC STAGES OF ELECTRICAL PROCESSES IN THE CEREBRAL CORTEX IN MAN DURING THE DEVELOPMENT OF SLEEP INHIBITION] Parabioticheskie stadii electricheskikh protsessov v kore golovnogo mozga cheloveka pri razvitii sonnogo tormozheniia — Biulleten' eksperimental'noĭ biologii i meditsiny (Moskva), 38 (9): 3-6. Sept. 1954. In Russian.
DLC (R91.B56, v. 37)

The purpose of the study was to determine changes in electrical processes of the cerebral cortex taking place as the result of stimulation of a sleeping man with light. A low degree of stimulation was attained by the light of a 40-W. lamp, medium stimulation by a light of a 100-W. lamp, and strong stimulation by the light of 200-W. lamp. As the depth of sleep inhibition developed, the rhythms of electrical processes in the brain cortex were regularly changing. Previously 7 stages of rhythm changes have been recorded: Stage A — alpha-rhythm with light drowsiness; stage B — indeterminate rhythm and drowsiness; stage C — "spindles" with superficial sleep; stage D — "spindles" and delta waves with deep sleep; stage E — delta waves with very deep sleep; stage zero — awakening. When a light was turned on in the room, the nature of the rhythm changed; electrical activity flared up in the form of slow alpha-rhythm waves which, according to the amplitude and duration of the flare-up biotics, reflected balancing, paradoxical and inhibiting stages, as sleep became gradually deeper. Generally the results indicated that as sleep became deeper, inhibition developed in stages, with the successive appearance of balancing and paradoxical phases, which reflected the degree and depth of sleep inhibition. Such changes could not be brought into evidence by the mere recording of the encephalograms without supplementary or auxiliary stimulation, which must be applied with caution, since stimulation of higher intensity applied at any sleep stage awakened the subject.

2856
Gurdjian, E. S., 1953
H. R. Lissner, F. R. Latimer, B. F. Haddad, and J. E. Webster
QUANTITATIVE DETERMINATION OF

ACCELERATION AND INTRACRANIAL PRESSURE IN EXPERIMENTAL HEAD INJURY. — Neurology, 3 (6): 417-423. June 1953.
DLC (RC321.A47, v. 3)

Concussive effects were produced by blows resulting in accelerations of 250 g to over 500 g. The intracranial pressure rise measured at the same time ranged from 25 to 95 p.s.i. Concussions of minimal, moderate and severe degree were obtained. The time duration of the pressure and the acceleration appeared to be the significant single factor which explained the clinical effects following impact. It was noted that at the lower values of pressure and acceleration a concussion was produced only if the duration of the acceleration and pressure was of an appreciable length. For the higher accelerations and pressures, it was apparently not necessary that they last for as long a time to produce concussion. (Authors' conclusion)

2857
Gurevich, I. I. (comp. and transl.)
[PROBLEMS OF AVIATION MEDICINE: A COMPILATION OF TRANSLATIONS FROM THE FOREIGN PERIODICAL LITERATURE] Voprosy aviatsionnoi meditsiny: sbornik perevodov iz zarubezhnoi periodicheskoi literatury. — Moskva: Izdatel'stvo innostrannoi literatury, 1954. 283 p. In Russian.
DLC (RC1067.G8, 1954)

This is a compilation of translations of articles and of excerpts of books on aviation medicine published in England, France, and the United States between 1948 and 1953. 585 references.

2858
Guth, S. K.,
and A. A. Eastman
BRIGHTNESS DIFFERENCE IN SEEING. — Amer. Jour. Optometry, 31 (11): 567-577. Nov. 1954.

The concept of brightness difference between the object and its background is proposed as an effective means of evaluating the effectiveness of illumination on visibility. Experiments establishing general trends and validity of the relationships between threshold and suprathreshold seeing and of the brightness difference concept are reported; the conversion of previous data established in terms of contrast and background brightness into brightness difference is also discussed.

2859
Gutner, L. B., 1952
W. J. Gould, and R. C. Batterman
THE EFFECTS OF POTENT ANALGESICS UPON VESTIBULAR FUNCTION. — Jour. Clinical Investigation, 31 (3): 259-266. March 1952.
DLC (R11.J67, v. 31)

Vestibular responses to morphine, meperidine, codeine, methadon, pantopon and acetylsalicylic acid were studied in man by means of the cold micro-caloric and galvanic stimulation methods. Morphine, meperidine, methadon, and pantopon increased labyrinthine sensitivity while codeine exerted an opposite action. Acetylsalicylic acid produced no changes in vestibular function. Meperidine produced an increased reaction in the cold micro-caloric test in both supine and ambulant patients, but the response in the latter was of greater magnitude. This resultant increase in labyrinthine sensitivity may be partially responsible for the higher frequency of dizziness, nausea and vomiting encountered in ambulant patients. (Author's summary)

2860
Gutner, L. B.,
W. J. Gould, and A. J. Cracovaner
EFFECTS OF CYCLINZINE HYDROCHLORIDE AND CHLORCYCLIZINE HYDROCHLORIDE UPON VESTIBULAR FUNCTION. - A. M. A. Arch. Otolaryngol., 59 (4): 503-509. April 1954. DLC (RF1.A7, v. 59)

The vestibular response of human subjects to 50 and 100 mg. of cyclizine hydrochloride and 100 mg. of chlorocyclizine hydrochloride were studied by

means of the cold microcaloric and galvanic stimulation methods. Cyclizine in 100-mg. dosage notably decreased labyrinthine sensitivity. The results with cyclizine, 50 mg., and chlocyclizine, 100 mg., were inconsistent and variable. The predictability of the effectiveness of cyclizine in the treatment and prophylaxis of vertigo and motion sickness, despite its very definite depression of labyrinthine sensitivity experimentally, must await further clinical trials. (Authors' summary)

2861
Guy, B. L.
QUALIFICATION OF TYPE A-12A OXYGEN REGULATORS MANUFACTURED BY THE ECLIPSE PIONEER DIVISION OF THE BENDIX AVIATION CORPORATION. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WCRD Technical Memorandum Report no. 54-58, June 24, 1954. 4 p. (Project no. S-660-157). AD 35 831
UNCLASSIFIED

Three type A-12A oxygen regulators were tested for compliance with the requirements of Specification MIL-R-7476 (USAF). These samples contained pure silicone second-stage diaphragms and a press-to-test button which loaded the demand diaphragm mechanically. Operational tests were conducted at 80° F. The regulators were then subjected to 160° F. for 7 hours while a pressure of 500 p.s.i. of oxygen was maintained on the inlet, and to a temperature of -85°F. for 48 hours. After testing, all parts were inspected and were found to be free from foreign material. Rubber parts were in good condition. The type A-12A oxygen regulators satisfied the performance requirements of Specification MIL-R-7476 (USAF). Placement of the part on the Qualified Products Listing for Specification MIL-R-7476 (USAF) was recommended. (AD abstract)

2862
Guzeev, IU. M.
[HEARING TESTS BY THE CONDITIONED REFLEX METHOD] K voprosu ob issledovanii slukha metodom uslovnykh refleksov. — Vestnik oto-rino-laringologii (Moskva), 16 (1): 68. Jan.-Feb. 1954. In Russian.
DLC (RF1.V4, v. 16)

Hearing tests by the conditioned-reflex method were proposed by P. A. Arandarenko in 1914 and supplemented by N. A. Pautov in 1923. However, the apparatus used by them was complex, which prevented the method from being adopted by clinics and hospitals. In this paper a simplified apparatus is described. Work with the latter convinced the author that the desired conditioned reflex could be brought into evidence without complying with certain complex experimental conditions proposed by P. A. Arandarenko. A red light or sounds of a bell or a buzzer, which I. P. Pavlov called "the relatively indifferent agents", used in the development of the conditioned reflexes, if frequently repeated, failed to act as the desired agent-stimulators of the central nervous system. In attempting to simplify the test method, the author made his experimental tests under normally prevailing conditions. Furthermore, he observed that the presence of other persons (outsiders), not related to the experimental work, aided in checking the subject's hearing. Best results were obtained when the test subject read a newspaper aloud. In making unilateral hearing tests, conditioned reflexes were developed by deafening the normal ear by the sounds of a ratchet drill. A drawing of the apparatus developed is presented.

2863
Haber, H., 1953
and S. [J.] Gerathewohl
[PHYSICS AND PSYCHOPHYSICS OF WEIGHTLESSNESS] Physik und Psychophysik der Gewichtslosigkeit. — Weltraumfahrt (Frankfurt), 4 (2): 44-50. 1953. In German.
DLC (TL789.W45, v. 4)

In an analysis of the effects of weightlessness on the human organism,

two possible situations may be assumed: (1) the subject is adapted to g = 1, and (2) the subject adapts himself to g = 0. In the first instance the subject will experience a continuous sensation of falling, while the second conditions will give rise to sensations of being lifted upwards. Some of the ensuing sensations will be overcome by the visual sense when observing objects which are stationary in respect to the body. However, if one accepts the validity of Fechner's law for the highly complex sense of gravity, serious consequences may result from the weightless state. Thus the intensity range for sensations from 0 to infinity corresponds to a stimulus range from g = 1 to g = ∞. However, the intensity range for sensations from 0 to -∞ will correspond to a stimulus range of g = 1 to g = 0. Therefore, in reducing the gravity to zero, the same range of sensations is obtained as in an unlimited increase of acceleration. The sensation of gravity becomes particularly critical when values of g approximate 0. At this point very minor changes in acceleration will result in highly intense sensations. At zero gravity self-induced accelerations through voluntary or forced movements of the organism become critical, because of the intensity of sensations evoked. These sensations are not experienced at normal gravity, since according to Fechner's law normally the small additional accelerations remain below the sensory threshold.

2864
Haber, H.

MAN AND MACHINE BETWEEN ATMOSPHERE AND SPACE. — Aeronaut. Engin. Rev., 13 (11): 56-62. Nov. 1954. DLC (TL501.A326, v. 13)

Modern flight is reaching into the "aeropause", i.e., altitude levels between 10 and 129 mi., comprising the last 12% of atmospheric mass. Such flights, ordinarily, last only a few minutes. Once the technical difficulties are overcome and rocket engines improved to the point of achieving speeds between 4.5 to 5 miles per second, space flight will develop rapidly. As duration of exposures to meteorites will be short, for the time being, the meteorite hazard will be negligible. Short-time exposures to cosmic radiation at heights over 20 miles, likewise, are not considered to be a serious threat. However, the effects of primary cosmic radiation for prolonged periods of time are still unknown. The lack of protection against ultraviolet radiation normally provided by atmospheric ozone is considered a serious hazard, as ultraviolet radiation may cause extensive damage to eyes and erythema of the skin in persons exposed to direct solar radiation even for a few minutes. Therefore, all vehicles designed to fly in the aeropause will have to be equipped with windows of a material capable of absorbing ultraviolet light. The attenuation of sky light at increasing altitude levels will interfere with normal visual performance on the part of the pilot. Uncomfortable brightness contrasts and glare are expected to produce visual discomfort and fatigue. Light-diffusing panels over certain window areas may help to shield the cockpit against direct sun rays and provide diffused light agreeable to the eyes. — Experimental studies on weightlessness have revealed the following: although weightlessness causes disturbances of orientation, of sensomotor functions and of muscular control, and lengthens the recovery period following black-out from acceleration, repeated exposures to weightlessness of 30 sec. duration result in some form of adjustment. At present, the effects of weightlessness for more than 4 minutes are still unknown.

2865
Haber, H.

THE PHYSICAL ENVIRONMENT OF THE FLYER. — School of Aviation Medicine, Randolph Field, Tex. 1954. vi+179 p. AD 33 688 PB 121025

The author presents a manual on the physical factors of the flyer's environment to serve as a guide to aeromedical research investigations. The Table of Contents is as follows:

The gaseous state of matter
General physics of the atmosphere
Geochemistry of the atmosphere
The atmosphere in the field of solar radiation
Atmospheric scattering and the light of the sky
Visibility in meteorology and aviation
The stratification of the atmosphere
Mechanical and thermal aspects of high-speed flight
The aeropause

162 references.

2866
Hackel, D. B.,
W. T. Goodale, and J. Kleinerman
EFFECTS OF HYPOXIA ON THE MYOCARDIAL METABOLISM OF INTACT DOGS. — Circulation Research, 2 (2): 169-174. March 1954.
DLC (RC681.A1A57137, v. 2)

Coronary blood flow and myocardial oxygen and carbohydrate metabolism were studied in normal intact dogs subjected to different degrees of hypoxia. Total left ventricular oxygen consumption was maintained during administration of 10 per cent and 5 per cent oxygen owing to increase in coronary flow and myocardial oxygen extraction. Ten per cent oxygen administration had little effect on carbohydrate uptake by the heart. Five per cent oxygen resulted in decreased coefficients of extraction for glucose, lactate and pyruvate, but total utilization was maintained. Complete anoxia resulted in negative arteriovenous differences for lactate and markedly decreased or negative values for pyruvate. (Authors' summary)

2867
Hahn, C. P.
THE IDENTIFICATION AND DESCRIPTION OF SOME CRITICAL AIRCREW JOB REQUIREMENTS. — American Inst. for Research, Pittsburgh, Pa. (Contract AF 33(038)-10576); issued by School of Aviation Medicine, Randolph Field, Tex. Feb. 1954. 40 p. (Project no. 21-29-014, Report no. 2). AD 28 357 PB 113878

Several thousand incidents of effective and ineffective behavior were elicited from flying officers by standardized interview procedures in order to define critical aspects of performance common to several aircrew jobs. The incidents were classified in terms of a relatively small number of job elements, which were then refined statistically in order to increase within-element homogeneity and between-element independence. Specifications were then developed for the construction of appropriate aptitude tests.

2868
Haig, T. O.
PLASTIC BALLOONS FOR HIGH ALTITUDE RESEARCH. — Jour. Aviation Med., 25 (4): 351-353. Aug. 1954.
DLC (TL555.A1A4, v. 25)

The development of large polyethylene balloons for high-altitude research is discussed. Balloons to date are available in sizes from 7 to 175 feet in diameter and having a full volume of three million cubic feet and are capable of carrying loads as great as a thousand pounds to 80,000 feet or a hundred pounds above 100,000 feet. An unofficial recommended safety code has been prepared by the Joint Services Balloon Committee to serve as a guide to agencies sponsoring balloon flights.

2869
Hake, H. W.,
and C. W. Eriksen
EFFECT OF THE NUMBER OF PERMISSIBLE RESPONSE CATEGORIES ON THE LEARNING OF A CONSTANT NUMBER OF VISUAL STIMULI. — Johns Hopkins Univ. Inst. of Cooperative Research, Baltimore, Md. (Contract AF 33(038)-22642); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air

Force Base, Ohio. WADC Technical Report no. 54-163, April 1954. v + 26 p. (RDO nos. 694-43 and 694-45). AD 50 284 UNCLASSIFIED

Subjects were required to learn to apply either two, four, or eight irrelevant verbal labels to a set of 16 similar and previously unfamiliar complex visual patterns. Immediately following practice in this task, subjects were required to learn to identify the patterns again using a different set of irrelevant verbal labels which were either two, four, or eight in number. The relative performance of subjects in the second phase was found to be significantly affected by the number of labels used in that phase but not by the number of labels which had been used in the initial phase. The amount of positive transfer effect found in the second phase was independent of the specificity of the labeling activity experienced in the first phase. The extent to which each subject correctly labeled each pattern in the first phase was not indicative to any important degree of his relative success in labeling each pattern in the second phase. The performance of each subject during the first phase, relative to the other subjects in each group, was indicative of relative performance within each group during the second phase. It was suggested that these results, which minimize the importance of the label-pattern associations formed during labeling practice, may be expected only in the case where relatively meaningless or indistinctive labels are employed. A definition of the distinctiveness of verbal labels was suggested in terms of the extensional meanings of the labels acquired in practice in identifying objects.

2870
Hale, F. C.
HUMAN FACTORS IN JET-TRANSPORT DESIGN. — Aeronaut. Engin. Rev., 13 (10): 84-86. Oct. 1954.
DLC (TL501.A326, v. 13)

The role of human engineering in the aircraft industry is reviewed. An outline of the make-up of the human factors group at the Santa Monica Plant of the Douglas Aircraft Company is presented. Two major studies were carried out in the cockpit. In the first the optimum location of instruments was established to provide the maximum utilization of personnel, at the same time eliminating unnecessary duplication of effort. This was done on the basis of a comprehensive study of crew duties under varying flight conditions, including emergency. In the second study, a statistical evaluation of seat width was carried out, fitting a greater percentile of population. Then a mathematical formulation was evolved for a minimum-weight fuselage cross-section perimeter, as related to seat width and population fitted. Current research in aerosanitation includes problems of water supply and waste-disposal systems. In this connection a study is being carried on among air carriers to determine accurately the amounts of wastes produced, as related to flight time, food and liquor consumption, and diurnal variation. An evaluation of the air-conditioning system has been made from a health and comfort standpoint in relation to such items as contamination by toxic materials and temperature and humidity control. Evaluating the work done by this group it seems obvious that human engineering has many facets and much to offer to the design engineer.

2871
Hale, H. B.,
K. I. Sydnor, and Max L. Sweat
ENDOCRINE, CARDIOVASCULAR, RESPIRATORY, AND BODY TEMPERATURE CHANGES IN MAN EXPOSED TO HYPOXIA COMBINED WITH HEAT. — Federation Proceedings, 13 (1[I]): 65-66. 1954.
DLC (QH301.F37, v. 13)

Nine different groups of young men were studied under standardized conditions in which the factors of oxygen pressure, environmental temperature, and time were varied. Physiological

determinations included several cardiovascular and respiratory indices, mean skin temperature, and rectal temperature. ACTH and adrenocortical steroid determinations were made on blood samples secured immediately after exposures were terminated. At least 6 men were subjected to each of the following sets of conditions: (a) normal control (breathing air at room temperature for 15 or 45 min.); (b) breathing 12% oxygen in nitrogen at room temperature (2, 15 or 45 min.); (c) breathing air at 50°C. (122°F.) (dry bulb temperature) for 15 or 45 min.; and (d) breathing 12% oxygen in nitrogen at 50°C. for 15 or 45 min. Baseline determinations (except hormone analyses) were obtained on all subjects during a 15-min. pre-exposure period. Cardiovascular responses to hypoxia were intensified by the heat factor. ACTH was not detected in the blood of controls or exposed subjects. No consistent pattern of change in blood adrenocorticoids was observed. (From the authors' summary)

2872
Hall, F. G.

BLOOD GAS TENSIONS IN DOGS FOLLOWING HYPERVENTILATION AT ALTITUDE. — Federation Proceedings, 13 (1[I]): 66. 1954.
DLC (QH301.F37, v. 13)

Twenty mongrel dogs were subjected to simulated altitudes ranging in pressure from 760 mm. Hg to 226 mm. Hg. These were uniformly hyperventilated and it was found that the duration of subsequent apnea varied inversely with the pressure altitude. Gas analyses were made on carotid and jugular blood during hyperventilation and apnea. Results are interpreted as indicating a change in sensitivity to pCO_2 and/or pH with changing degrees of hypoxia. (From the author's summary)

2873
Hall, F. G.,
K. D. Hall, and J. Barker

FACTORS AFFECTING THE DURATION OF APNEA FOLLOWING HYPERVENTILATION AT ALTITUDE. — Duke Univ. School of Medicine, Durham, N. C. (Contract AF 33(616)-377); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-321, June 1954. iv + 11p. (RDO no.696-77). AD 43 528
UNCLASSIFIED

Also published in: Jour. Aviation Med., 25 (5): 492-499. Oct. 1954.
DLC (TL555.A1A4, v. 25)

The duration of apnea subsequent to forced ventilation of the lungs in anesthetized dogs was influenced by the composition of the ventilating gases. Blood analyses showed that, when oxygen tensions are relatively lower, a low CO_2 existed at the resumption of breathing and when oxygen tensions were relatively higher, a high CO_2 existed at the resumption of breathing. These results show that hypoxic and CO_2 stimuli are additive in establishing the threshold for the onset of breathing. There is some indication of a change in sensitivity to CO_2 at different oxygen tensions. There was a decrease in the duration of apnea in anesthetized dogs subjected to forced ventilation at various simulated altitudes. This duration was directly related to the change in the pressure of ambient air. (Authors' summary)

2874
Hall, F. G.,
and J. Barker

PERFORMANCE OF ACCLIMATIZED MICE AT ALTITUDE. — Proc. Soc. Exper. Biol. and Med., 86 (1): 165-167. May 1954. DLC (QP1.S8, v. 86)

Mice acclimatized to one altitude (350 mm. Hg) showed an increase in performance on the treadmill when exposed to a higher altitude (257 mm. Hg) as compared with ground level controls. When acclimatized mice were bled, they showed a decrease in their performance level. However, their performance was still at a higher level than that of the unacclimatized

controls. Analyses showed that their hemoglobin concentration after bleeding was lower than that of the controls even though their performance was much better. Also, the decrease in performance was not in proportion to the blood withdrawn indicating that an increase in hemoglobin concentration is probably not the sole criterion for an increase in performance at altitude. (Authors' summary, modified)

2875
Hall, J. F.,
J. W. Polte, R. L. Kelley, and J. Edwards
SKIN AND EXTREMITY COOLING OF CLOTHED HUMANS IN COLD WATER IMMERSION. — Jour. Applied Physiol. 7 (2): 188-195. Sept. 1954.
DLC (QP1.J72, v. 7)

Same as item no. 1524 (Vol. II).

2876
Halpin, A. W.
THE LEADERSHIP BEHAVIOR AND COMBAT PERFORMANCE OF AIRPLANE COMMANDERS. — Jour. Abnormal Social Psychol., 49 (1): 19-22. Jan. 1954. DLC (RC321.J7, v. 49)

This is an expansion of a study previously published by the author, as item No. 1531 (vol. II). In developing a Leader Behavior Description Questionnaire, on which the members of 52 B-29 crews described the behavior of their airplane commander, two major dimensions of leadership were identified: Consideration and Initiating Structure-in-Interaction. The correlation between these dimension scores is .45. This questionnaire was administered to 33 airplane crews in training in this country for description of their commanders. Later, 29 of these commanders on combat assignment in the Far Eastern Air Force were again described by their crews. Ratings on seven aspects of the combat performance of these commanders were secured from their administrative superiors. An index of each crew's satisfaction with its commander was also computed. A trend toward negative correlations was found between the superiors' ratings and the Consideration scores, and positive correlations between these ratings and the Initiating Structure scores. Conversely, the correlations between the Satisfaction Index and the dimension scores showed a trend in the opposite direction. Thus, the superiors and subordinates were inclined to make opposing evaluations of the contribution of these dimensions to the effectiveness of leadership. This difference in evaluation confronts the leader with conflicting role expectations. Further research is needed to determine the precise techniques used by different leaders in an attempt to resolve this conflict, and to analyze the consequences of these techniques for both the personal adjustment of the leader and the effectiveness of the group. (Author's summary, modified)

2877
Halsey, R. M.,
and A. Chapanis
CHROMATICITY-CONFUSION CONTOURS IN A COMPLEX VIEWING SITUATION. — Jour. Optical Soc. Amer., 44 (6): 442-454. June 1954.
DLC (QC350.06, v. 44)

This experiment measured confusion contours for 58 standard colors distributed throughout the CIE constant-luminance diagram. Matches were made to these standards from an assortment of 342 heterogeneous colors arranged in a display which presented 171 of them simultaneously. The viewing conditions approximate those found in certain complex display situations. Twenty subjects were used in the experiment. Each subject was required to indicate those colors on the display board which provided satisfactory matches for each of the standard colors. Contours on the CIE diagram are drawn to show the percentage of times various chromaticities were confused. From these contours we have selected colors which can be discriminated with high levels of accuracy and so are suitable for coding

qualitative and quantitative information. In general, the contours follow trends suggested by extrapolation from precise threshold data. (Authors' summary)

2878
Handford, S. W.,
T. E. Cone, H. I. Chinn, and Paul K. Smith
DRUGS PREVENTING MOTION SICKNESS AT SEA. — Jour. Pharmacol. and Exper. Therapeutics, 111 (4): 447-453. Aug. 1954. DLC (RS1.J85, v. 111)

Three drugs, scopolamine hydrobromide, Benadryl and Postafene, were re-evaluated as preventives of motion sickness. In the doses employed, Benadryl and Postafene afford significant protection with few untoward side effects; scopolamine provides no protection and is conducive to the significant manifestation of unpleasant side effects. Chloropromazine tested for the first time at sea, gives no significant protection, whereas Lilly preparation 01780, also tested for the first time, is effective at the 0.02 P level. The incidence of seasickness is again shown to decrease with increasing age and also to correlate with a previous history of motion sickness. From the standpoint of long-time protection afforded by a single dose, Postafene is most promising, sine it gives good protection for at least 24 hours. (Authors' summary)

2879
Handler, E.,
and R. G. Evans
EVALUATION OF COLLAPSIBLE TYPE DITCHING SEAT. — Naval Air Experimental Station. Aeronautical Medical Equipment Lab., Philadelphia, Pa. Report no. TED NAM AE-6316, Nov. 15, 1954, 31 p. + 31 plates.
AD 50046 UNCLASSIFIED

Three types of aft-facing collapsible ditching seats, differing mainly in materials used in their construction, were statically and dynamically tested to determine their ditching and crash protective properties. Dynamic tests were made using the HG-1 catapult and an anthropomorphic dummy. Average accelerations applied to the catapult car, upon which the test load was mounted, ranged from about 10 to 38 g, lasted from about 0.22 to 0.12 seconds, and were approximately square in shape. Overshoot of acceleration measured in the dummy reached values more than twice that applied to to the catapult car. Tensions measured in each lower seat suspension strap were as high as 1.5 times the total load computed as the product of mass and applied acceleration, while in each upper seat suspension strap, tensions as high as the total load, computed as above, were measured. With certain modifications to the basic structure, it is concluded that a nylon-mesh and strap (re-enforced) collapsible ditching seat would provide adequate protection for personnel against forces engendered during aircraft ditching and crashes. It is therefore recommended that this type of modified seat be accepted for use in multi-place long range type aircraft. (Authors' abstract)

2880
Hansel, C. E. M.
APPARENT MOVEMENT AND EYE MOVEMENTS. — Brit. Jour. Psychol. (London), Gen. Sect., 44 (2): 145-155. May 1953. DLC (BF1.B7, v. 44)

Apparent movement may be due to inability of the visual mechanisms to provide, under the stimulus conditions in which they are obtained, physiological cues which differ from those evoked by moving objects. Experiments have been carried out which show that intermittent excitation of a large area of the retina at a suitable frequency may produce inhibition of response on a small area intermittently illuminated at a similar frequency but out of phase. Such an inhibition effect is capable of reducing the physiological cues produced by real movement so that they are similar to those produced under stimulus conditions for apparent movement. It is postulated that not all

the information provided by excitation of the retina under conditions of real movement is utilized by the brain. This seeming deficiency is thought to be due to a mechanism of use in providing increased efficiency of vision by suppressing signals from the retina which are produced during eye movements. (Author's summary)

2881
Hansen, D. B.
ARTERIAL BLOOD PRESSURE IN UNANESTHETIZED HYPOTHERMIC RATS. — Jour. Applied Physiol. 6 (10): 645-649. April 1954.
DLC (QP1.J72, v. 6)

Mean arterial pressure of cold-anesthetized rats, measured with an optical manometer, did not fall below 90 mm. Hg despite reduction of the colonic temperature to near lethal temperatures. In contrast, pentobarbital anesthesia greatly limited the temperature to which a rat could be cooled safely. The lethal effects of hypothermia and pentobarbital seemed to be additive. There was no relationship between pulse rate and blood pressure in the hypothermic cold-anesthetized rat. Above the lethal temperature there was no essential difference between the blood pressures of hypothermic rats that survived cooling and those that did not, provided the pressure remained measurable. When the blood pressure failed, it fell precipitously rather than slowly. On no occasion did the severe drop in blood pressure reverse itself. (Author's summary)

2882
Hardy, J. D.
SUMMARY REVIEW OF HEAT LOSS AND HEAT PRODUCTION IN PHYSIOLOGIC TEMPERATURE REGULATION. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5413, Oct. 14, 1954. iv + 46 p. AD 55 217 UNCLASSIFIED

Studies on the comparative physiology of temperature regulation revealed that the method of temperature control observed in man was not present in the Cebus monkey and was present only to a limited degree in the cat. However, the dog appeared to be an adequate experimental subject for analyzing defects in thermoregulation. In man, an internal body temperature of 37° ± 1°C. is the regulated temperature, and regulation is effected by (1) automatic physiologic regulation involving body reactions, and (2) servo control involving the use of outside power. Studies are reported on the effect on temperature regulation of external thermal stress, internal stress, and internal and external thermal stress combined. An electrical analog of temperature regulation in man is presented, and a schematic diagram is given of a computer circuit which may be used for solving simplified equations of heat loss. (AD abstract)

2883
Hardy, J. D.
SUMMARY REVIEW OF THE INFLUENCE OF THERMAL RADIATION ON HUMAN SKIN. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5415, Nov. 10, 1954. vi+49 p. (Project Report no. NM 001 090.04.04). AD 49 309 UNCLASSIFIED

Discusses the following aspects of thermal radiation effects: Introduction (spectral distribution of solar and low-temperature radiation); Optical characteristics of skin (spectroscopic measurement of reflectance from the skin; spectral distribution of skin transmittance); Thermal characteristics of skin (density and thermal capacity of the living skin); Stimulating effects of thermal radiation (warm and cold sensation, threshold of warm sensation and pain); Heat loss by radiation (thermal radiation exchange between man and his environment in New York City and in the Arctic, tested with the aid of panradiometer). 26 references.

2884
Hardy, L. H.,
G. [W.] Rand, and M. C. Rittler
H-R-R POLYCHROMATIC PLATES. — Jour. Optical Soc. Amer., 44 (7): 509-523. July 1954. DLC (QC350.06, v. 44)

A description is given of the H-R-R Polychromatic Plates and evaluation of their use as a device (1) to separate subjects with defective color vision from those with normal vision, (2) to classify the type of defect (qualitative diagnosis), and (3) to indicate the extent of the defect (quantitative diagnosis). For this evaluation 780 subjects were used. As a screening instrument H-R-R plates were shown to be in complete agreement with the revised A. O. test in separating subjects with defective red-green vision from those with normal vision. In classification of subjects with defective red-green vision into deutan and protan types, the H-R-R test is about as successful as the Nagel Anomaloscope. The estimates of the extent of the defect by H-R-R test were compared with performance on the Navy lantern, the School of Aviation Medicine color threshold tester, the dichotomous test, and a resistor color code test — all of which are aptitude tests designed to select subjects with defective color vision who can still meet the requirements of specific tasks. The series of H-R-R plates which is used to quantitatively classify subjects with mild defect agrees best with the color threshold tester in terms of the percentage of the total group who qualify. It is shown that the percentage of persons who pass the aptitude tests significantly and consistently decreases as the severity of defect shown by the H-R-R plates increases. The practical importance of a simply administered, comprehensive test, such as H-R-R plates, in vocational selection and guidance is discussed. (Authors' summary, modified)

2885
Harris, F. H.
ACUTE CARBON TETRACHLORIDE POISONING. — U. S. Armed Forces Med. Jour., 3 (7): 1023-1028. July 1952. DLC (RC970.U7, v. 3)

A case of mass poisoning by carbon tetrachloride, used for cleaning purposes at the U. S. Naval Receiving Station in Washington, D. C., is reported. Out of 78 men directly or indirectly exposed for 1-16 hours, 49 reported symptoms, including nausea, giddiness, vomiting, dark urine, diarrhea, oliguria, headache, anuria, indigestion and nervous tension. Only 15 men needed medical care and may be considered true victims of poisoning. The following conclusions are reached: Exposure to concentrated fumes for 3 hours is enough to cause serious kidney or liver damage, or both. Alcoholic intake prior to or immediately after exposure to carbon tetrachloride enhances the development of poisoning.

2886
Harris, J. D.
THE ROLE OF SENSATION LEVEL AND OF SOUND PRESSURE IN PRODUCING REVERSIBLE AUDITORY FATIGUE. — Laryngoscope, 64 (2): 89-97. 1954. DNLM

Reprint issued also as: Naval Medical Research Lab., New London, Conn. Report no. 244 (vol. 13, no. 5), April 19, 1954. (Project Report no. NM 003 041.56.02). AD 36 616 UNCLASSIFIED

A test for screening fatigue-susceptible individuals was investigated. A tone of 2048 c.p.s. was sounded for five minutes at 97 db. sound pressure level (80 db. on the audiometer). The subject's recovery curve was carefully plotted at 4096 c.p.s., the region most affected by such stimulation. Results were analyzed in terms of sensation level (data of their own threshold), and physical intensity. Sensation level proved the more important parameter. The criterion used for this determination was the time in seconds to return to within 5 db. of the subject's own threshold, or the residual hearing loss after 1 minute.

A pulsing tone should be used for testing rather than a steady one in determining threshold during recovery from stimulation; this helps minimize the high tone tinnitus which sometimes follows stimulations such as used here. (Author's summary, modified)

2887
Harrison, J. M., 1953
and C. Phoenix
THE EFFECT OF VISUAL ANGLE AND DEGREE OF IMPERFECTION UPON THE RECOGNITION OF OBJECTS. – Boston Univ. Optical Research Lab., Mass. Technical Note no. 104, Sept. 1953. 9 p. + 7 figures. (Contract AF 33(616)-432). AD 20 410
UNCLASSIFIED

A study was conducted to measure the recognizability of imperfect images as a function of visual angle and the degree of imperfection. Test objects were artificial "photographs" of semicircles and isosceles triangles. The "grain" was a grid of squares upon which the semicircles and triangles were superimposed such that those squares more than half enclosed by the object were painted black and the rest left white. By using different size squares, varying object area-square area (O/S) ratios were obtained. Visual angle was altered by varying the distance between the subject and the stimulus. The subject was asked to judge whether each stimulus was a semicircle or a triangle. For visual angles in the range 25-159 minutes, the number of correct responses increased as the O/S ratio increased. At visual angles less than 25 minutes an increase in recognition was obtained for all O/S ratios that had not previously yielded 100% recognition. (Authors' abstract)

2888
Hart, J. S.,
and O. Héroux
FAT METABOLISM OF MICE EXPOSED TO COLD ENVIRONMENTS [Abstract]. – Revue canadienne de biologie (Montreal), 13 (5): 470. Dec. 1954. In English.
DLC (QH301.R47, v. 13)

The fat and protein losses of two groups of mice, one pre-exposed to moderate cold and the other kept at room temperature, upon exposure to freezing temperatures were studied.

2889
Hart, J. S.
UTILIZATION OF ENERGY RESERVES AT LOW TEMPERATURES IN MICE ACCLIMATED TO WARM, MODERATE AND COLD ENVIRONMENTS [Abstract] – Revue canadienne de biologie (Montreal), 13 (1): 66. March 1954. In English. DLC (QH301.R47, v. 13)

Mice were acclimated to various environmental temperatures (+30°C. to -10°C.) and then subjected to lethal low temperatures. Weight loss of mice killed by low temperatures was the greater the longer the mice survived. Changes in liver and muscle glycogen reserves, blood sugar, body fat, and protein content are discussed.

2890
Harvey, C. M.
SICKLE-CELL CRISIS WITHOUT ANEMIA, OCCURRING DURING AIR FLIGHT. – Military Surgeon, 115 (4): 271-275. Oct. 1954.
DLC (RD1.A7, v. 115)

Sickle-cell crisis with splenic infarction occurring in a young and apparently healthy Negro male soldier, during flight at an altitude not exceeding 10,000 feet, is reported. This case serves to confirm the impression previously reported by other authors that the sickling phenomenon, high altitude flying, and splenic infarction constitute a clinical triad. Seven of the eight cases so far reported including the present one were treated with splenectomy with good results. The present state of our knowledge concerning the physiology of sickling does not permit a detailed explanation for the association of high altitude flying and the sickling phenomenon, but the presumption is

strong that anoxia is the precipitating factor. (Author's summary)

2891
Harvey, R. B.
and J. A. Schilling
RELATIONSHIP BETWEEN LUNG PRESSURES AND VOLUMES AND TRAUMATIC AIR EMBOLISM. — Federation Proceedings, 13 (1[I]): 68. 1954. DLC (QH301.F37, v. 13)

The unopened thoraces of nembutalized dogs were expanded after occluding the trachea by reducing the air pressure in the chamber in which the dogs were placed to a predetermined value within 2 sec. The functional residual volume was determined previously by decompression at the end expiratory position with the trachea open to a spirometer. Subsequently, measured amounts of air were added to the initial volume. The animal was then decompressed from ground level to 250 mm. Hg with closed airways and kept there from 15-20 sec. before return to ground level. Tracheal, intrapleural, pulmonary arterial and venous, femoral arterial and chamber pressures were recorded using strain gages. Criteria of lung rupture and air embolism used were a fall in tracheal pressure, reduction of tracheal pressure below control values when the chamber was brought back to ambient pressure, change in electrical conductance between an electrode catheter in the pulmonary vein and the tissues, and lung hemorrhage. Control measurements were made by decompressing the dog without tracheal occlusion. It was found that lung rupture and air embolism first occurred at lung volumes approximately 3 times the functional residual volume. A large pressure gradient between the air passages and the pulmonary vein develops with lung distention. (From the authors summary)

2892
Hasan, J.,
A. Laamanen and M. Niemi
EFFECT OF THERMAL STRESS AND MUSCULAR EXERCISE, WITH AND WITHOUT INSULIN HYPOGLYCAEMIA, ON THE BODY TEMPERATURE, PERSPIRATION RATE, AND ELECTROLYTE AND LACTATE CONTENT OF SWEAT. — Acta physiologica scandinavica (Stockholm), 31 (2-3): 131-136. 1954. In English. DNLM

The effects of thermal stress (Finnish Sauna bath) and muscular exercise (on treadmill) on the rise in body temperature, on the sweating rate, and on the electrolyte and lactate content of sweat were studied. In one half of the experiments, hypoglycemia was induced by intravenous injections of insulin. There were no significant differences in the rate of sweating and in the composition of sweat during insulin hypoglycemia and during euglycemia. There was some tendency to increased values with decreased blood sugar concentrations in the lactate content of sweat. The rise in body temperature under insulin hypoglycemia was significantly lower than in experiments without insulin injection. The reason for this observation is briefly discussed. (Authors' summary)

2893
Hasan, J.,
and M. Niemi
METABOLIC RESPONSES OF HUMAN SUBJECTS TO SEVERE ACUTE THERMAL STRESS. — Acta physiologica scandinavica (Stockholm), 31 (2-3): 137-145. 1954. In English. DNLM

The purpose of this work was to study (a) the changes in the metabolic rate of man brought about by high environmental temperature, (b) the influence of thermal stress, and (c) possible correlation between metabolic rate, rectal temperature, skin temperature and pulse rate. Thermal stress was induced in a sauna (Finnish bath) with air temperature varying in different experiments from 55°C. dry-bulb/36°C. wet-bulb to 71°C./39°C. The oxygen consumption, rectal temperature, skin temperature and pulse rate of 16 subjects were recorded during and after

the exposure to extremely high environmental temperatures. A rise in the metabolic rate during thermal stress was observed, with a subsequent fall after it. No decrease in the metabolic rate below the pre-heating level could be observed during the first hour, 10 hours, and 18 hours after the thermal stress. Positive correlations between the metabolic rate and the rectal temperature, and pulse rate were observed. (Authors' summary, modified)

2894
Hasbrook, H.A.
CRASH SURVIVAL STUDY: DE HAVILLAND DOVE ACCIDENT AT STATEN ISLAND AIRPORT ON DECEMBER 9, 1952. — Cornell Univ. Medical College. Crash Injury Research, New York. Transport Aircraft: Release no. 3-13, Nov. 1954. 32p. AD 59 829 PB 118545

Crash-survival details of a 95 m.p.h. (35° nose-down angle) crash involving a twin-engine de Havilland Dove transport aircraft, in which two of four occupants survived, are presented and analyzed. Information is given on the impact speed and attitude of the aircraft, and on the magnitude, direction and duration of the principal impact (crash) force. The kinematic behavior of the intact fuselage, the damage to the cabin and seats, and the injuries sustained in relation to occupant location are described. Photographs and diagrams are shown. Findings are discussed and recommendations are made relative to crash-survival design in future transport aircraft. (Author's abstract)

2895
Hattwick, R. G.
DARK ADAPTATION TO INTERMEDIATE LEVELS AND TO COMPLETE DARKNESS. — Jour. Optical Soc. Amer., 44 (3): 223-228. March 1954. DLC (QC350.06, v. 44)

The course of the change of the visual threshold was measured during adaptation from a high-luminance level to various lower luminance levels and to darkness. Measurements were both foveal and parafoveal. The foveal measurements show photopic function only, while the parafoveal measurements result in duplex curves at the lower luminances. All curves approach their asymptotic values smoothly and gradually. The theoretical and practical implications of the findings are discussed in relation to human engineering. (Author's summary)

2896
Hausund, E.,
and H. Jungmann
[CIRCULATORY REACTIONS DURING CABLE TRIPS IN THE ALPS] Kreislaufreaktionen bei Bergbahnfahrten in den Alpen. — Medizinische Klinik (München), 49 (19): 775-777. May 7, 1954. In German. DNLM

Experiments were conducted to investigate the circulatory effects of changes in altitude. Twenty-eight healthy subjects were transported from altitudes of 570-950 m. to altitudes of 2200-2300 m. daily for several days. Examinations were made at the start of the journey, at midpoint, and at the summit, and again on the return trip. Twenty-four subjects showed a decrease relative to the initial recordings in heart rate and minute blood volume upon arrival at the midpoint (1700-1900 m.) and an increase in corresponding vascular blood flow. Thus a vagotonic phase was indicated which lasted until the summit was reached. After one-half to two hours at the summit, this was replaced by a second amphotonic phase, indicated in most cases by an increased heart rate and stroke and minute volume. Several subjects showed an increased blood pressure without increase in heart rate, and some showed an increased rate without increased blood pressure. This phase reached a maximum, one and one-half to two hours after arrival at the summit and decreased after three hours. Upon descent, vagotonia was again noted, accompanied by fatigue. Similar

experiments performed in a decompression chamber produced the second phase effect, but not the first. Of particular interest in the mountain experiment was the result obtained from a hyperthyroid subject, who showed no first, but a strong second phase, and from two hypothyroid subjects, who showed a marked first but no second phase. One of these latter, when given thyroid extract, eventually showed a small second phase. Further investigations of these effects would appear to be valuable in the investigation of circulatory disturbances. (cf. item no. 2634)

2897
Hauswirth, O.
[A SHORT REPORT ON THE V. NEUROVEGETATIVE SYMPOSIUM IN VIENNA, AUGUST 30 TO SEPTEMBER 1., 1954. TOPIC: THE PHYSIOLOGY AND PATHOLOGY OF THERMOREGULATION] Kurzbericht über das V. Neurevegetative Symposium in Wien vom 30. VIII. bis 1. IX. 1954. Thema: Physiologie und Pathologie des Wärmehaushaltes. — Acta neurovegetativa (Wien), 10 (3): 401-408. 1954. In German. DNLM

R. Thauer discussed the physiology of thermoregulation pointing out that oxygen utilization is a function of temperature. The respiratory volume increases parallel to increases in temperature and humidity. Regulatory processes are stimulated by the absolute temperature of the skin and blood. Plasticity of the nervous system is discussed in connection with thermoregulation. C. Kayser reported on hibernation and experimental hypothermia in mammals. He emphasized in particular the physiological differences between a hibernator and nonhibernator in summer as well as in winter. Hypothermia of a nonhibernator is poikilothermia due to loss of thermoregulation, while poikilothermia in a hibernator is still a thermoregulatory process. W. Shoedel discussed the phenomena in systemic hypothermia. Reports were given on hyperthermia in fever, in heat stroke, and that caused by pyrogenic substances.

2898
Hauty, G. T.
THE EFFECTS OF DRUGS UPON THE COMPONENTS OF HAND STEADINESS. — School of Aviation Medicine, Randolph Field, Tex. June 1954. 8 p. (Project no. 21-1601-0004, Report no. 5). AD 41 507 PB 115444

Sixty-six male, basic airmen volunteers were given practice on an apparatus designed to measure the two principal components of hand steadiness and then randomly assigned to six groups receiving differing dosages of analeptic and sedative drugs. An hour following the administration of drugs, three successive measurements of hand steadiness were obtained at hour intervals. The results were then treated by a split-split-plot designed analysis of variance in order to appraise the possibility of differential drug effects upon the two components throughout the period of testing. It was found that a given drug differentially affects the two hand-steadiness components, fine tremor and coordinate activities. Seconal reduced the former but adversely affected the latter. Dexedrine, on the other hand, increased fine tremor but did not significantly affect the latter component. Temporal diminution of the effects within the three-hour period following administration of the drugs was evidenced but not at a high level of statistical significance. Doubling the standard dosage of Dexedrine had no significant effect where-as 200 mg. as compared to 100 mg. of Seconal did effect a significantly greater reduction in fine tremor. (Author's summary and conclusions)

2899
Hauty, G. T.,
and R. B. Payne
EFFECTS OF WORK PROLONGATION UPON COMPONENTS OF A PERCEPTUAL-MOTOR TASK. — School of Aviation Medicine, Randolph Field, Tex.

Oct. 1954. 8 p. (Project no. 21-1601-0004, Report no. 6). AD 54 729
PB 116238

One hundred sixty-eight basic airmen volunteers having received preliminary training on a compensatory pursuit task involving simulated aircraft instruments and controls were randomly assigned to the 42 combinations of 7 pharmacological conditions, 3 systems of presenting information of performance adequacy, and 2 differing proximities of goal, and then required to perform the task for a period of 7 hours. In addition to the principal measurement of proficiency which consisted of the accumulative time that all instruments were concurrently maintained within their limits of tolerated error, the accumulative time that each individual instrument was maintained within its limits of error was also obtained. The proficiency in the control of the individual instruments, rates of decline in these proficiencies, and the interactive effects of the experimental variables were appraised. (Authors' summary)

2900
Hauty, G. T.,
and R. B. Payne
MITIGATION OF WORK DECREMENT [Abstract] — Amer. Psychologist, 9 (8): 392. Aug. 1954. DLC (BF1.A55, v. 9)

This experiment was conducted to determine the singular and joint effects of pharmacological and psychological conditions upon proficiency during a prolonged period of work at a complex perceptual motor task. A group of 168 Air Force basic trainees volunteered to participate as subjects in the investigation. Results showed: (1) D-amphetamine (5 mg.) effectively mitigated work decrement for the entire period of 7 hours and was as effective for this period as a multistage capsule which released equivalent dosages at 4-hour intervals. A caffeine derivative was also effective but for a shorter period of time. The addition of d-amphetamine (5 mg.) to a preparation of diphenhydramine hydro chloride (50 mg.) and scopolamine (.65 mg.) had the desired effect of reducing but not eliminating the effects of sedation upon performance. (2) The greater efficiency of perceptual behavior afforded by supplementary signals resulted in a superiority of work proficiency which was sustained for the 7 hours of work. (3) The pace of work effected by the more immediate goal resulted in superior work proficiency throughout the 7-hour period. And (4) effects induced during the prolonged task were not transferred to performance of a dissimilar terminal task. (Quoted in part)

2901
Hawkins, D. F.
THE INFLUENCE OF DIETARY FACTORS ON PERFORMANCE OF MUSCULAR WORK. — Arhiv za higijenu truda (Zagreb), 5 (2): 225-248. 1954. In English. DLC (RA421.A69, v. 5)

A short review of the present knowledge of the influence of dietary factors on muscular performance is presented. The paper is divided into four separate parts: approach to experimental work in man, the fuel of muscular work, individual dietary factors and general and miscellaneous factors. A selected bibliography of 58 references is given. (Author's abstract)

2902
Heath, C.,
and E. B. Brown
HEMODYNAMIC CHANGES FOLLOWING 30% CARBON DIOXIDE BREATHING IN DOGS. — Federation Proceedings, 13 (1[I]): 68-69. 1954.
DLC (QH301.F37, v. 13)

In order to determine the relative role of reduction in cardiac output and peripheral resistance to hypotension, 30% CO_2 in oxygen was administered from an open system to Pentothal anesthetized dogs. Cardiac output was determined by the direct Fick method before, 5 min. after, and 2 hr. after the CO_2 breathing. Central arterial pressure was recorded continuously during the blood sampling by means of a strain

gauge connected to a catheter inserted through the carotid artery into the aorta. Within 5 min. after returning the dogs to air breathing, mean arterial pressure usually fell to approximately one-half the control level. The data indicate that a reduction in cardiac output accounts for this hypotension with no significant change in peripheral resistance at this time. When the fall in blood pressure was prevented by the intravenous administration of norepinephrine, cardiac output fell to the same extent as before and the blood pressure was maintained entirely by an increase in peripheral resistance. (From the authors' summary)

2903

Hedman, A. R.,
and P. O. Åstrand

[LONG MOUNTAIN EXCURSION ON EMERGENCY RATIONS] Langtur i fjällen pa nödproviant. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 3 (2): 15-20. 1954. In Swedish. DNLM

An investigation undertaken by the Gymnastika Central-institut has revealed that the present emergency rations for flight personnel are sufficient in quality as well as quantity for a period of 3 days, even under extreme working conditions. A series of experiments are described carried out on subjects who walked 65 km. with relatively heavy packs to the summit of Kebuekaise Mountain (1800 m.). The emergency rations used amounted to 4000 cal. per day per person. Since in the mountains there would be no access to effective means of transportation in case of emergency, a pilot forced down in mountainous territory would use up more calories per kilometer. On the other hand, he would transport less weight. Moreover, in emergencies, the stored body fat is oxidized supplementing the caloric intake. From a physiological point of view it is recommended that the main part of the emergency rations consist of carbohydrates. The actual ingestion of food should take place in daytime during periods of greatest muscular activity. Also, fluid intake should be increased as much as possible.

2904

Heemstra, H.

THE DEVELOPMENT OF AN INCREASED PULMONARY VASCULAR RESISTANCE BY LOCAL HYPOXIA. — Quart. Jour. Exper. Physiol. (London), 39 (2): 83-91. April 1954. DNLM

An increase in pulmonary vascular resistance on unilateral breathing of 5% oxygen occurs in two distinct phases. The first maximum is reached in about 15 min. from the onset of hypoxia, after which the resistance falls until it reaches a minimum in the second half-hour. The second phase is represented by a gradual increase in resistance during the next eight hours, at the end of which the blood flow through the hypoxic lung is reduced to about 60% of the original value. (Author's summary)

2905

Heinemann, E. G.,
and T. Marill

TILT ADAPTATION AND FIGURAL AFTER - EFFECTS. — Jour. Exper. Psychol., 48 (6): 468-472. Dec. 1954. DLC (BF1.J6, v. 48)

Three experiments were performed to determine the change in apparent tilt of lines after long inspection. In Experiments I and III, the standard line was always vertical and the cardboard upon which the standard was presented was tilted 10° either clockwise or counterclockwise. In Experiment II the standard line and the cardboard upon which it was presented were both tilted 10° from the vertical in the same direction. Thus, although in Experiment II the line was tilted 10° relative to the vertical, it was always parallel to two of the edges of the cardboard. In Experiment II, it was found that there is no significant tendency for a line to appear to turn toward the vertical when an alignment effect is excluded. The results are discussed in terms of J. J.

Gibson's adaptation and Köhler and Wallach's satiation theories. (Authors' summary, modified)

2906

Hellmann, K., 1953
and J. S. Weiner
ANTIDIURETIC SUBSTANCE IN URINE FOLLOWING EXPOSURE TO HIGH TEMPERATURES. — Amer. Jour. Physiol., 6 (3):194-198. Sept. 1953.
DLC (QP1.J72, v. 6)

The effect of short exposure to high temperatures on the output of antidiuretic substance in the urine of healthy young men has been studied. No antidiuretic activity was found in the urine passed immediately prior to entering the hot room and rarely in the hot room itself. Urine passed after leaving the chamber, however, in nearly every case showed antidiuretic activity. (Authors' summary)

2907

Hempel, W. E.,
and E. A. Fleishman
A FACTOR ANALYSIS OF PHYSICAL PROFICIENCY AND MANIPULATIVE SKILL. – Air Force Personnel and Training Research Center. Skill Components Research Lab., Lackland Air Force Base, Tex. Research Bulletin AFPTRC-TR-54-34, Aug. 1954. iii + 15 p. (Project no. 7703, Task no. 77084).
AD 49 238 PB 115828

A standardized battery of tests was administered to airmen to investigate the interdependence of abilities contributing to individual differences in gross physical proficiency and fine manipulative performance, and to identify possible ability categories which might be useful and meaningful in describing performance in these areas. The tests fell into three general categories: (1) manipulative apparatus tests (17 tests), (2) printed tests (6 tests), and (3) gross physical performance tests (23 tests). Fifteen factors were identified to account for performance on the 46 experimental tests. While the precise nature of several of the factors is yet uncertain, some general conclusions appear possible. The results indicate that the abilities contributing to performance on gross physical tasks are quite independent of those contributing to fine manipulative skill. No factors were found that overlapped these areas. Pending the identification of additional factors or clarification of the present ones, the factors identified suggest a possible classification of ability areas primarily involved in a wide range of motor tasks, especially those of a gross physical nature. It is stated that future research should be directed at validating the factors obtained against more complex motor performance.

2908

Hempel-Jørgensen, J. 1953
[HELICOPTERS] Helikoptere. – Militaerlaegen (København), 59 (1): 19-22. March 1953. In Danish.
DLC (RC970.D3, v. 59)

The use of helicopters for transporting the sick and the wounded is discussed, with particular reference to ambulance helicopter services established in the United States. The author considers helicopters to be ideally suited for such use in Denmark.

2909

Henderson, A. M.
DOWNWARD EJECTION. — Combat Crew, 5 (4): 27-29. Oct. 1954.
DLC

The author's experience in downward ejection from a B-47 plane flying at 203 knots is related. The completely automatic equipment, including hatch and ejection seat, seat separation device, and parachute, all functioned successfully. There was no significant sensation experienced except for a feeling of confusion immediately after ejection. It was found in ejections made by other personnel, however, that at 200 knots the seat could be manually prevented from disengaging from the subject, and that at 390 knots minor injuries to the arms resulted when the

hands were forcibly separated by the airstream from their grip on the seat apparatus. It was concluded that the equipment involved in the test was adequate for present use, but that to avoid minor injuries, further adjustments were necessary.

2910
Hendler, E.,
and R. G. Evans
TEST AND EVALUATION OF MODEL R3Y DITCHING SEAT. — Naval Air Experimental Station. Aeronautical Medical Equipment Lab., Philadelphia, Pa. Report no. TED NAM AE-6302, July 3, 1954. 15p. + 11 plates. AD 36 985
UNCLASSIFIED

Eleven shots were made using the HG-1 catapult and an anthropomorphic dummy to test and evaluate an aft-facing ditching seat for Model R3Y aircraft. In the catapult tests, the seat was mounted either along the direct line of the catapult thrust (0 degrees) or at 20 degrees to the left of the thrust line. The seat was designed to restrain personnel during a 0-degree (head on) or a 20-degree ditching on water. The catapult car, on which the the ditching seat was mounted, received an approximate square wave of acceleration, which was varied from an average of 5.8 g of 0.31 seconds duration to 25.4 g of 0.154 seconds. The ditching seat showed no major failures in any test. During the simulated 0-degree ditchings, there was no indication that physiologically dangerous forces were applied to the dummy. In the simulated 20-degree ditchings, the rotation of unrestrained legs with respect to the relatively stationary torso did seem to apply dangerous forces to the dummy. This rotation could probably be prevented or minimized by securing the legs or modifying the lateral edges of the seat by the addition of material or straps. (Authors' summary)

2911
Henn, O. 1953
[CHLORIDE CONTENT OF SWEAT AT HIGH TEMPERATURES AND HIGH RELATIVE HUMIDITY DURING REST]
Der Chloridgehalt des Schweisses bei hoher Temperatur, hoher relativer Feuchtigkeit, aber körperlicher Ruhe. — Arbeitsphysiologie (Berlin), 15 (2): 93-98. 1953. In German. DNLM

The effects of hot and humid environments on the chloride content of sweat were experimentally investigated in resting individuals whose body temperatures were rising. An increase was noted in sweat chloride concentration as well as an increase in the total amount of chlorides excreted. After lengthy acclimatization, the amount of chlorides excreted in sweat decreased. A short period of acclimatization, however, may produce the opposite results. Contradictory values were obtained for serum chlorides after acclimatization, as both increases and decreases in blood serum concentration were observed in different individuals.

2912
Henneman, R. H.,
and E. R. Long
A COMPARISON OF THE VISUAL AND AUDITORY SENSES AS CHANNELS FOR DATA PRESENTATION. — Univ. of Virginia, Charlottesville (Contract W33(038)-ac-21269); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-363, August 1954. v + 38 p. Project no. 7192. AD 61 558
PB111651

It is the contention of the present report that the choice between the eyes and the ears as sense channels for the presentation of information to the human operator rests upon the specific demands of various operational situations. Three sets of variables impose demands for the presentation of data, some of which have implications for visual or auditory presentation. These three sets of demands are: (1) demands imposed by response variables (e.g., orientation in space, fine

quantitative comparison, rapid referability); (2) demands imposed by operator variables (e.g., previous habits, fatigue, motivation); and (3) demands imposed by special environmental conditions favoring one or the other sense channel (e.g., ambient noise, sudden changes of illumination, excessive vibration). The stimulus properties of light and sound differ; the receptor characteristics of vision and audition also differ. It is possible, by matching these distinguishing sense characteristics with specific demands of particular situations, to suggest some "division of labor" between the two sense channels for purposes of data presentation. Four principal categories of demands for informational input have been proposed as follows: (1) typical demands for visual presentation; (2) typical demands for auditory presentation; (3) typical demands served by either sense alone; (4) typical demands for dual audio-visual presentation. (Authors' abstract)

2913
Henry, F. M. 1953

AVIATORS "BENDS" PAIN AS INFLUENCED BY ALTITUDE AND IN-FLIGHT DENITROGENATION. — Univ. of California, Berkeley (Contract AF 18(600)-20); issued by Wright Air Development Center. Aero Medical Lab., Wrignt-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-227, March 1953. iv + 48 p. (RDO no. 696-61). AD 16 860
UNCLASSIFIED

Experiments in the altitude chamber of the University of California (Berkeley) show that descent to a cabin altitude of 31,600 ft. reduces the pain of aviator's "bends" to moderate severity. Below 28,000 ft. the pain is mild; it disappears (on the average) at 23,900 ft. Cases of bends kept at 10,000 or 15,000 ft. show a reduction in aeroembolism directly related to "storage" time; in 3 hr. there is a 13,000 ft. gain in critical altitude. Frequently repeated ascent and descent does not change the critical altitude. With "storage" at 20,000 or 25,000 ft. the pain altitude changes very little within 3 hr., presumably because there is growth of sub-clinical tissue bubbles. In-flight denitrogenation for the prevention of aeroembolism symptoms should therefore be carried out at 10,000-15,000 ft. without sacrifice of protection. Available preoxygenation tables give valid predictions if physical exertion is mild; with heavy work, considerably more denitrogenation is required. Protection is achieved by reducing symptom intensity rather than delaying onset of aeroembolism. Renitrogenation progresses as the mirror image of denitrogenation. (Author's abstract)

2914
Henschel, A. F.

SUMMARY REMARKS. — In: Spector, H., and M. S. Peterson (ed.), Nutrition under climatic stress..., p. 13-14; discussion, p. 15-18. Nat. Acad. of Sci.—Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 PB 117996

Essentially, the nutritional problems in the services imposed by climatic extremes resolve into two types: (1) methods of supply, storage, and preparation of food, and (2) provision of nutrients adequate in quantity and quality to maintain the men with minimum of deterioration regardless of the degree of climatic stress to which they are exposed.

2915
Henschel, A.[F.],
H. L. Taylor, and A. Keys

PERFORMANCE CAPACITY IN ACUTE STARVATION WITH HARD WORK. — Univ. of Minnesota. Lab. of Physiological Hygiene, Minneapolis (Contract AF 33(038)-21914); issued by School of Aviation Medicine, Randolph Field, Tex. March 1954. iv+8 p. (Project no. 21-32-004, Report no. 6). AD 30 949-B PB 114270

Four male subjects were starved for 2.5 days (series A), and 12 men were

starved for 5 days (series B). The average total caloric deficit was about 9000 Cal. in series A and 16,000 Cal. in series B. The mean weight loss was 4.5 kg. (6.7%) in series A and 5.5 kg. (7.8%) in series B. The men walked at 3.5 m.p.h. on a 10% grade for 4 hours a day in series A and 3 hours a day in series B. The mechanical efficiency of grade walking decreased parallel with a decrease in the nonprotein R.Q. and an increase in the relative amount of fat metabolized during work. The ability to perform exhausting anaerobic work was impaired after the first day of starvation. On the second day, the score on the Harvard Fitness Test decreased to 70% of the control values; on the fourth day, the score dropped to 40%. No change was detected in the maximal oxygen intake per kg. of body weight during the 5-day fast. Measurements of blood-lactate concentrations indicated no deterioration, at the end of the first day, of the physiological response to a fixed anaerobic task; on the fifth day of the fast, a definite increase in blood-lactate concentration and in the 10-min. O_2 debt was observed. Recovery of performance was studied after 4 and 5 days of refeeding. The physical deterioration associated with the loss of 40-50 g. of nitrogen under these conditions, was repaired within 3 to 5 days of refeeding. (AD abstract)

2916
Hensel, H.
[PHYSIOLOGY OF THERMAL RECEPTION] Physiologie der Thermoreception. — Ergebnisse der Physiologie biologischen Chemie und experimentellen Pharmakologie (Berlin), 47: 166-368. 1952. In German. DLC (QP1.E6, v. 47)

The present status of thermoreception, both, as conscious perception of thermal stimuli, and as the mediation of sensory stimuli for thermoregulation of the organism, is reviewed in detail with emphasis on the more recent work. (582 references)

2917
Heroux, O.,
and J. S. Hart
ADRENAL CORTICAL HORMONE REQUIREMENT OF WARM AND COLD ACCLIMATED RATS AFTER ADRENALECTOMY. — Amer. Jour. Physiol., 178 (3): 449-452. Sept. 1954.
DLC (QP1.A5, v. 178)

Different groups of rats acclimated for 2 months at 30°C. and 6°C. were adrenalectomized and provided with 0.9% saline drinking solution or injected with a daily dose of 15, 30, 45, 60, or 90 dog units (U) of adrenal cortical extracts (Wilson) for 17 days. Four other groups of intact and sham-operated rats, also acclimated to 30°C. and 6°C., served as controls. After 17 days, survival time of each rat was determined at -29°C. In the 30°C. acclimated rats, the minimum dose at which body weight was maintained fell between 15 and 30 U, but in the 6°C. acclimated animals it was 15 U or less. It is concluded that after adrenalectomy, the minimum amount of adrenal cortical extract (ACE) required for maintaining body weight was not higher in cold than in warm acclimated rats. However, the rats did not survive at 6°C. without some ACE. After 17 days of constant cortical treatments, the cold acclimated adrenalectomized rats were more resistant to extreme cold than either the normal or the adrenalectomized warm acclimated rats, but their resistance was much lower than the normal cold acclimated animals. This indicates that acclimation, once it is established, can be partly maintained by a constant and relatively low rate of administration of cortical hormones, which does not appear to be any greater than that required for maintaining acclimation to a warm environment. (Authors' summary)

2918
Heroux, O.,
and J. S. Hart
COLD ACCLIMATION AND ADRENAL CORTICAL ACTIVITY AS MEASURED

BY EOSINOPHIL LEVELS. — Amer. Jour. Physiol., 178 (3): 453-456. Sept. 1954. DLC (QP1.A5, v. 178)

Absolute eosinophil counts and change in eosinophil level 4 hours after injection of ACTH (Thorn index) were used as indices of adrenal cortical activity during development of cold acclimation in male white rats. ACTH, injected at different intervals during acclimation to 6°C., produced an increasing fall in eosinophils up to the 20th day, followed by a gradually decreasing response up to the 53rd day. The observed trend in eosinophil response to ACTH indicates that the higher adrenal activity, known to occur during the first few days of exposure to cold, gradually reaches a maximum in about 20 days and then returns to its preacclimation level. The Thorn index, therefore, provides further evidence that the adrenals of fully acclimated rats, although hypertrophied, are not hyperactive. The variations in adrenal activity measured by the Thorn index were not reflected in changes in absolute eosinophil levels, measured in rats acclimated for two months at 10° and 6°C. Absolute eosinophil counts are not therefore believed to be reliable indices of adrenal activity during cold acclimation. (Authors' summary)

2919
Heroux, O.,
and J. S. Hart
COMPARISON OF FOUR INDICES OF ADRENAL ACTIVITY IN RATS ACCLIMATIZED TO 30°, 15°, 1°C. — Amer. Jour. Physiol., 178 (3): 445-448. Sept. 1954. DLC (QP1.A5, v. 178)

Adrenal and thymus weights, adrenal ascorbic acid concentrations and alkaline phosphatase activity in the liver, usually considered as indices of adrenal activity in sudden shock exposure, have been compared in two strains of rats (Wistar-Sprague Dawly and Wistar) after a prolonged exposure to 30°, 15°, or 1°C. In both strains, adrenal weight increased with decrease in temperature, but the thymus weight and adrenal ascorbic acid concentrations remained constant. Alkaline phosphatase activity in the liver was constant at the three temperatures in Wistar-Sprague Dawley rats but not in Wistar rats. The positive alkaline phosphatase response to cold of the latter strain, together with body weight loss at the lowest temperature, suggest unsuccessful acclimation to cold. In spite of the strain difference, adrenal weights were equally influenced by acclimation temperatures. These findings suggest that in spite of larger adrenals in the cold acclimated rats, the adrenal cortical activity may not be increased. This interpretation applies more clearly to Wistar-Sprague Dawley than to Wistar rats. (Authors' summary)

2920
Heroux, O.,
and J. S. Hart
RESTRAINT HYPOTHERMIA AND ITS INHIBITION BY COLD ACCLIMATION. — Amer. Jour. Physiol., 117 (2): 219-221. May 1954. DLC (QP1.A5, v. 177)

The effect of restraint on skin and rectal temperatures of 30°C. and 6°C. acclimated rats was determined at 6°C. Under restraint in a narrow cage, the 30°C. acclimated rats suffered a progressive fall in skin and rectal temperatures. In a wider cage, however, normal temperatures were maintained. In the 6°C. acclimated rats, similar restraint caused a significant decrease in skin temperature but had no effect on rectal temperature. The difference in response between the two groups was apparently not associated with greater body weight (or more compression) of the 30°C. rats since no correlation was found between body weight and degree of hypothermia of individual rats of the same acclimation group. (Authors' summary)

2921
Herrera, F. M.
AIR TRANSPORTABLE SURGICAL VAN (Report on Interservice Conference Held at Aero Medical Laboratory, WADC, on 20-21 January 1954). —

Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-529, Nov. 1954. iv+32 p. (Project no. 6333, Task no. 63154). AD 66 442 UNCLASSIFIED

In the interest of interservice coordination, a conference was held on the development of an Air-Transportable Surgical Van. Representatives of the Army, Navy, and Department of Defense conferred with members of the Air Force in January 1954 at the Aero Medical Laboratory, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio. The Air Force requirement for airborne medical facilities, though similar to the needs of other services, is distinct in its weight, space, setup time, and roadability requirements. Detailed discussions of this conference are presented to give the reader background information on this air age development of medical care. (Author's abstract)

2922

Herrick, R. M.

FOVEAL LUMINANCE DISCRIMINATION AS A FUNCTION OF THE DURATION OF THE DECREMENT OR INCREMENT IN LUMINANCE. — Columbia Univ., New York (Contract AF 33(038)-22616); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-463, Oct. 1954. iv + 15 p. (Task no. 71544). AD 51 051 PB 111599

The minimum observable change in brightness (luminance) as a function of (a) the orginal adapting brightness and (b) the duration of the change was investigated. The brightness of a 1° centrally fixiated adapting field was varied from .01 to 1000 millilamberts. The duration of the increment was varied from .0035 to 2.013 sec. It was found that the longer the duration of the change in brightness, up to a critical point, the less the change in brightness required to be detected. Up to this critical point, the change in brightness ($\triangle$ I) multiplied by its duration (t) equaled a constant ($\triangle$ I x t = k). For longer durations the just detectable change in brightness is constant ($\triangle$ I = k). The critical duration varies inversely as a function of the adapting brightness — the higher the brightness the shorter the critical time over which the relationship $\triangle$ I x t = k holds. These findings agree with the Bunson-Roscoe law and indicate further that this law holds for a decrement as well as for an increment in brightness. (From the author's abstract)

2923

Herrington, L. P.

HEAT TOLERANCE AND NUTRITION; SUGGESTIONS FOR NEW DIRECTIONS IN INVESTIGATION AND INTERPRETATION. — In: Spector, H., and M. S. Peterson (ed.), Nutrition under climatic stress..., p. 176-182; discussion, p. 200-203. Nat. Acad. of Sci.—Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 UNCLASSIFIED

An attempt is made to show that the limits of heat tolerance for various periods of time may be predictable from exhaustion times in work under cool conditions. Furthermore, the data suggest the underlying community of abilities to tolerate diverse stresses, despite important differences in the physiological details of these adjustments. Illustrations are given of long-term constitutional adjustments to climate in the vascular, glandular, and body organ fields, with the thought that these neglected long-term factors should receive increased attention in studies of the nutritional factors involved in climatic adjustments. (Author's summary, modified)

2924

Herrligkoffer, K. M.

[PERVITIN IN THE HIMALAYAS] Pervitin im Himalaya. — Münchener medizinische Wochenschrift (München), 96 (24): 698-702. June 11, 1954. In German. DNLM

The use of pervitin (1-phenyl-2-methylaminopropane) in the treatment of altitude sickness is discussed. Similar in structure and physiologic activity to adrenaline, pervitin affects the central nervous and peripheral circulatory systems. The physical and psychological effects of hypoxia are by its action largely counteracted. Pervitin causes vascular constriction and an increase in heart stroke volume, resulting in a rise in blood pressure. Unlike adrenaline, pervitin does not achieve its effect through tachycardia. In addition, since both the heart and the vascular system are affected directly, the beneficial effects of pervitin are more prolonged. Psychological improvement results from the stimulation of the central nervous system, and an increased capacity for work is noted. The use of pervitin is strongly recommended in ascents to high altitude.

2925
Hertzberg, H. T. E.,
G. S. Daniels, and E. Churchill
ANTHROPOMETRY OF FLYING PERSONNEL—1950. — Antioch Coll., Yellow Springs, Ohio (Contract AF 18(600)-30); and Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 52-321, Sept. 1954. vi + 134 p. (RDO no. 695-71) AD 47 953 PB 111583

Body size data for 132 measurements of over 4,000 Air Force flying personnel are presented. Organization of the survey is briefly discussed and the techniques of measurement are illustrated by photographs for the benefit of other anthropologists. Both diametral and surface measurements are included. Dimensions are given in both centimeters and inches. A description of the statistics and an explanation of their use are given with some discussion of certain statistical shortcuts employed in the reduction of the data. The tabulations include range, mean, standard deviation, coefficient of variation, and twenty-five selected values from the first to the ninety-ninth percentile. Means and standard deviation values for each dimension are also given for nine subgroups based on flight duties. A glossary and bibliography are included. These data are presented for use by the designers of aircraft, clothing and equipment. (Authors' abstract)

2926
Hertzka, A. F.,
J. P. Guilford, P. R. Christensen, and R. M. Berger
A FACTOR-ANALYTIC STUDY OF EVALUATIVE ABILITIES. — Educational and Psychol. Measurement, 14 (4): 581-597. Winter 1954.
DLC (BF1.E3, v. 14)

The purpose of this study was the exploration of the domain of evaluative abilities. The hypotheses were constructed in terms of differences between evaluative performances. It was assumed that different evaluative abilities are called upon as the task is varied. A battery of 47 tests was administered to 397 air cadets and student officers of the USAF Air Training Command, 36 being designed as measures of evaluative abilities and 11 being reference tests. Sixteen factors were extracted by Thurstone's complete centroid method. The reference axes were rotated orthogonally by Zimmerman's graphic method. Six of the fourteen identified factors may be considered to be in the domain of evaluation with the possible exception of redefinition, which has been found once before in a study of creative abilities. Of the evaluation factors, Logical Evaluation and Speed of Evaluation can be cross-identified with previously isolated factors, and Verbal Classification, Perceptual Evaluation, and Experiential Evaluation appear to be new factors. A Judgement factor, well confirmed on several occasions in the Air Force research program, did not emerge, as had been expected. (Authors' summary, modified)

2927
Hertzman, A. B.,
W. C. Randall, C. N. Peiss, and J. G. Adams
FACTORS INFLUENCING THE SIGNIFICANCE OF LOCAL SWEATING RESPONSES. — St. Louis Univ. School of Medicine, Mo. (Contract AF 18(600)-96); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. AF Technical Report no. 6680, part 12, on Studies of Cutaneous Heat Losses, Jan. 1954. vii+20 p. (RDO no. 696-69). AD 27 729 PB 114175

Local sweat gland responses were measured by the desiccating capsule and sweat-print techniques. The sweat prints indicated the shorter cycles more clearly than did the capsular data. Trunk sweating was recorded by 19 capsules placed on anterior, lateral, and posterior locations; a few strategically located capsules provided data adequate to calculate the mean sweating rate of a major area. The mean sweating rate of the body was estimated from capsular samples of regional sweating rates and compared with the weight loss of the subject. Data were corrected for the effect of the "pressure sweat reflex." Standing failed to alter the sequence of sweating, but it increased the rate of sweating of the upper part of the body. Neither prone nor supine positions affected sweating rates on the anterior or posterior aspects or on the right or left sides, although the prone position resulted in temporarily higher sweating rates on all surfaces. (From the AD abstract)

2928
Hervey, G. R.,
and R. A. McCance
THE PROVISIONING OF EXPEDITIONS IN THE FIELD: EMERGENCY RATIONS. — Proc. Nutrition Soc. (London), 13 (1): 41-45. 1954.
DLC (TX501.N9, v. 13)

The problems of nutrition associated with emergency conditions are discussed. Physiological principles, special environmental requirements, and practical ration compositions are treated. It is emphasized that ideal requirements for survival must be balanced by practical considerations of weight, probable length of time of exposure, and probable environmental conditions, and that therefore the type of emergency survival equipment provided must often be discretionary in individual instances.

2929
[Hetherington, A. W.]
AIR FORCE TESTS MAN TO 45 GRAVITY FORCE. — Jet Propulsion, 24 (1): 49. Jan.-Feb. 1954.
DLC (TL780.A613, v. 24)

Experiments using rocket sleds have proved that humans can withstand acceleration or deceleration of 45 g with only "pressure-type" skin bruises resulting, according to Dr. A. W. Hetherington of the Air Force's Department of Human Factors of the Air Research Development Center in Baltimore. Extremely high accelerations were exerted for only brief periods. Further results indicate that it may be possible to subject the human body to 100 to 150 g if certain conditions — particularly proper physical support for the body — are strictly met. If the subject is not given sufficient support, an acceleration of even 5 g could produce temporary blindness and loss of hearing. Other studies being undertaken by the Department were discussed; in particular, the prolonged existence of mammals in sealed cabins, oxygen generation from solid materials, the heat tolerance of human beings (it has been shown that man can perform light tasks for about 6 min. in a 200°F. atmosphere) the effects of cosmic radiation and the effects of subgravity on the body. Experiments concerned with the latter problems were performed using conventional aircraft in a ballistic trajectory. The subgravity effect, similar to that produced in a rapid elevator descent, was achieved for a period of 18 sec. in some cases. (Quoted in part)

2930
Hick, W. E. 1953
SOME FEATURES OF THE AFTER-CONTRACTION PHENOMENON. — Quart. Jour. Exper. Psychol., 5 (4): 166-170. Nov. 1953.
DLC (QP351.E95234, v. 5)

Investigation of the after-contraction phenomenon (unintentional muscle contraction following relaxation of the same set of muscles after a sustained voluntary contraction) was suggested by unpublished research relating it to the performance in instrument flight and susceptibility to fatigue. Excessive deviations from the norm in the duration and extent of the after-contraction were negatively correlated with optimum performance in certain flying skills. In the present experiment after-contraction was found to be superimposed on small voluntary contractions of the same muscles but not on antagonist contraction; to be inhibited by instructions favoring relaxation; and to be increased by a difficult concurrent task. An explanation based on the sensory adaptation and the organism's attempt to compensate is offered.

2931
Hilding, A. C. 1953
STUDIES ON THE OTIC LABYRINTH. III. ON THE THRESHOLD OF MINIMUM PERCEPTIBLE ANGULAR ACCELERATION. — Annals Otol. Rhinol. and Laryngol., 62 (1): 5-14. March 1953. DLC (RF1.A6, v. 62)

Using angular acceleration of a Barany chair, mechanically controlled by two Graham transmissions, minimum perceptible angular acceleration was studied. It was found that when a subject is turning slowly without acceleration or deceleration, after having been subjected to low rates of both, he seems to be unable to determine when the acceleration or deceleration has ceased. Near threshold a "gyratory illusion" similar to the optical illusions from ambiguous or unusual retinal signals seems to occur. Signals from the labyrinth similar in their ambiguousness seem to develop in the consciousness a definite sense of turning in one direction or another, even when there is no change in acceleration. (From the author's summary)

2932
Hirsh, I. J.
STUDIES ON AUDITORY MASKING, FATIGUE, AND SPEECH INTELLIGIBILITY. — Central Inst. for the Deaf, St. Louis, Mo. (Contract AF 18 (600)-131); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-203, June 1954. iv+12 p. (RDO no. R-695-63). AD 43 521
UNCLASSIFIED

This report summarizes research on auditory masking and fatigue. The main results concern the threshold of intelligibility for spondaic words as a function of the level of various bands of noise and the intelligibility of several types of speech material as a function of either the level of white noise or the amount of frequency restriction in a noiseless system. A final section describes further work on masking and fatigue that was initiated under this contract but was incomplete on the termination date. (From the author's abstract)

2933
Hitchcock, F A.
PHYSIOLOGICAL AND PATHOLOGICAL EFFECTS OF EXPLOSIVE DECOMPRESSION. — Jour. Aviation Med., 25 (6): 578-586. Dec. 1954.
DLC (TL555.A1A4, v. 25)

The author summarizes and reviews the results of 10 years of investigation concerning the physiological and pathological effects of explosive decompression which was conducted at the Laboratory of Aviation Physiology at Ohio State University. This work is discussed under the following headings: experiments on animals, work on human subjects, cardiovascular effects, temperature effects, and, finally, the effect of explosive decompression to barometric

pressure less than the vapor pressure of blood and body fluids.

2934
Hochrein, M., 1953
and I. Hochrein-Schleicher
[IMPROVEMENT OF PERFORMANCE; PERFORMANCE; FATIGUE; KEEPING FIT] Leistungssteigerung; Leistung; Übermüdung; Gesunderhaltung. — 3rd rev. ed., 283 p. Stuttgart: Georg Thieme Verlag, 1953. In German.
DLC (QP301.H6)

This work is intended primarily for researchers in the field of industrial medicine and public health. Of particular interest to aerospace medicine are the chapters dealing with the following subjects: fatigue, exhaustion, and stress and their relation to circulatory disturbances; effects of noise and vibrations on performance; chronic and total sleep deprivation; the effects of interference with the diurnal activity rhythm on work performance; and improvement of performance by diet, rest, exercise, climatic therapy, and drugs. 633 references.

2935
Högberg, P.
[SPORTS SUITABLE FOR FLYING PERSONNEL] Lämpliga idrotter för flygande personel. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 3 (1): 19-23. 1954. In Swedish. DNLM

The objectives of athletics in pilot training are as follows: (1) to improve the trainee's general physical condition; (2) to strengthen the functions of the organs exposed to the stresses of flying (high altitude, and g forces); (3) to improve sensory functions; (4) to increase the pilot's ability to endure stresses encountered in emergency landings by training him in suitable sports such as swimming and skiing; and (5) to obtain in recreation a release from the tensions flyers are subjected to constantly. Among other recommended sports are running, skiing, swimming, rowing, bicycle riding, calisthenics, fencing, shooting, and various ball games.

2936
Hoelscher, B.,
and K. R. Reissmann
THE COMBINED EFFECTS OF HYPOXIA, ADRENALECTOMY AND THYMECTOMY IN PARABIOTIC RATS. — Endocrinol., 54 (2): 147-153. Feb. 1954.
DLC (QP187.A25, v. 54)

Three combinations of intact, thymectomized, and adrenalectomized rats were studied with the parabiotic technique. Either both partners of the parabiotic pairs breathed ambient air, or one partner was exposed to hypoxia while the other breathed ambient air. Hemoglobin, hematocrit, and red blood cell count values were increased in both partners when hypoxia was imposed on one parabiont. Adrenalectomy of one parabiotic partner was followed by a compensating hypertrophy of the adrenals left in the co-partner, which was higher in degree following exposure to hypoxia. Heart weights on non-adrenalectomized partners were increased above the normal level, while those of their adrenalectomized partners were below normal level. This difference was intensified if the non-adrenalectomized partner breathed a hypoxic mixture. The livers of hypoxic partners, when united with unexposed adrenalectomized partners, showed a slight fatty infiltration. Removal of the thymus had no appreciable effect. The adrenalectomized partner breathing ambient air in most instances died first when hypoxia was imposed on the co-partner. This suggests that the hormonal output of hypertrophied adrenals, which meets the hormonal requirements of both partners when breathing ambient air, becomes critically insufficient for the adrenalectomized partner when the demand for adrenal cortical steroids is increased in the opposite member by hypoxia. (Authors' summary, modified)

2937
Hoelscher, B.
COMPARATIVE STUDY OF HYPOXIA

AND PHYSICAL EXERCISE IN INTACT-ADRENALECTOMIZED PARABIOTIC RATS. — Federation Proceedings, 13 (1[I]): 70-71. 1954.
DLC (QH301.F37, v. 13)

While intact adrenalectomized parabiotic rats survived in good condition when both partners breathed ambient air, the adrenalectomized partners in most instances died when the intact partners were exposed to hypoxia. Heart weight was invariably below normal in the adrenalectomized and above normal in the intact partners. Although only one partner breathed an oxygen-deficient gas mixture, hemoglobin, hemoglobin, hematocrit, and red bood cell count were increased in both partners. To answer the question whether or not the adrenalectomized partners died from the blood changes as such, intact partners of another series were exposed to runs on the treadmill while the adrenalectomized partners were kept quiet. Although hemoglobin, hematocrit, and red blood cells were rather decreased in both partners, 2/3 of the adrenalectomized partners died within a period of 2 weeks. Changes in cardiac weight after adrenalectomy of 1 parabiont were of the same sort as mentioned above. However, when both partners were intact, neither hypoxia nor physical exercise had the afore-mentioned effects on heart weight and survival. These findings suggest a critically insufficient transfer of adrenal cortical hormones to adrenalectomized parabionts when their intact partners are exposed to hypoxia and physical exercise. (From the author's summary)

2938
Hoelscher, B.
MECHANISMS OF ALTITUDE ADAPTATION: THE EFFECT OF ADRENALECTOMY ON CARDIAC OUTPUT OF PARABIOTIC AND SINGLE RATS. — School of Aviation Medicine, Randolph Field, Tex. June 1954. 9 p. (Project no. 21-1201-0001, Report no. 7). AD41 512
PB115296

A comparative study of the effect of adrenalectomy on parabiotic and single rats was made. Hemoglobin, hematocrit, and red blood cell count values of parabiotic rats agreed with those of single rats. Adrenalectomy of one partner of parabiotic pairs caused a compensatory hypertrophy of the adrenals of the intact co-partner. A statistically significant difference in heart and thymus weights was found between the parabionts after adrenalectomy of one partner. The cardiac output was invariably decreased in the adrenalectomized rats, and this decrease was higher in degree in the adrenalectomized parabionts. These findings are interpreted with respect to the existence of a parabiotic barrier for the transmission through the anastomosis of adrenal steroids. (School of Aviation Medicine abstract)

2939
Hoelscher, B.
A METHOD OF MEASURING MUSCULAR FATIGUE IN RATS. — Jour. Applied Physiol., 6 (7): 448-452. Jan. 1954.
DLC (QP1.J72, v. 6)

A method is described for measuring the work output of the electrically stimulated masseter muscle of intact rats during exposure to hypoxia in a small altitude chamber using a mechano-electrical transducer as the pickup device. The stimuli, the muscular responses, the electrocardiogram, and respiration data were recorded simultaneously. Comparison of the recordings revealed cardiac function to be a significant factor involved in muscular fatigability. The method has proven to be of particular value in measuring the course of acclimatization at the muscular tissue level over an extended period. (Author's summary, modified)

2940
Hoffman, E. L.,
and J. H. Rohrer
AN OBJECTIVE PEER EVALUATION SCALE: CONSTRUCTION AND VALIDITY. — Educational and Psychol.

Measurement, 14 (2): 332-341. 1954
DLC (BF1.E3, v. 14)

This is a condensation of item no. 1584, vol. II.

2941 1953
Hollander, E. P.
THE RELATIONSHIP OF LEADERSHIP CHOICE TO AUTHORITARIAN ATTITUDES IN A MILITARY SETTING. — Naval School of Aviation Medicine, Pensacola, Fla. Report no. NM 058.16.01, Jan. 26, 1953. 30+iii p., 13 Tables. AD 10 397 UNCLASSIFIED

This study attempts to determine something of the social characteristics of naval aviation cadets chosen for a hypothetical position of military leadership by their peers. In particular, an authoritarian attitude scale (F-scale) was utilized to tap the social or interpersonal factor, while leadership choice was determined by the use of a sociometric leadership form. With a sample of 268 cadets completing the U. S. Naval School, Pre-Flight, a negative relationship was obtained between authoritarianism scores and leadership nomination scores (r=-.23). The influence of other variables, such as intelligence, was also considered. It was concluded that high scorers on an authoritarianism attitude scale were less acceptable as leaders to their peers, even within the context of a military setting. The relationship of authoritarianism to such individual attributes as social intelligence and social perception was discussed. (Author's abstract)

2942
Hollander, E. P.,
and J. T. Bair
ATTITUDES TOWARD AUTHORITY-FIGURES AS CORRELATES OF MOTIVATION AMONG NAVAL AVIATION CADETS. — Jour. Applied Psychol., 38 (1): 21-25. Feb. 1954
DLC (BF1.J55, v. 38)

Essentially the same as item no. 493, vol. I.

2943
Hollander, E. P.
BUDDY RATINGS: MILITARY RESEARCH AND INDUSTRIAL IMPLICATIONS. — Personnel Psychol., 7 (3): 385-393. Autumn 1954.
DLC (HF5549.A2P53, v. 7)

From a base provided by sociometry, a relatively new procedure for personnel assessment through coworker evaluations has been developed. Particularly within the armed forces, recent years have seen the employment of such evaluations as an integral part of personnel research programs. One notable technique, "buddy ratings" – sometimes called "peer ratings" or "peer nominations" — has achieved prominence for the unique supplementary data on personnel which it can yield. The research done on the buddy ratings technique affords extensive evidence in support of its validity and reliability. The author reviews accumulated evidence of the predictive value of peer ratings with the intent of highlighting the possible utility of them in industrial settings. (Author's summary, modified)

2944
Hollander, E. P.,
and W. B. Webb
LEADERSHIP, FOLLOWERSHIP AND FRIENDSHIP. — Naval School of Aviation Medicine, Pensacola, Fla. Jan. 28, 1954. 7+3 p (Project Report no. NM 001 058.16.03). AD 35 224
UNCLASSIFIED

This is a study of the relationship between leadership, followership, and friendship. Peer nominations of Naval Aviation Cadets were used. These consisted of nominations by each member of a well defined cadet group of three fellow members as high or low on leadership; high or low on followership; and their three best friends. Leadership nominations were found to be considerably independent of friendship nominations. Leadership and followership nominations were highly related. The findings imply that leader-

ship and followership nominations contain a factor unique from friendship. Further, when a man is not a good leader, he is not necessarily a good follower Rather, the man judged as a good group member is typically the same man who is judged as capable of leadership. (Naval School of Aviation Medicine abstract)

2945

Hollander, E. P.

PEER NOMINATIONS ON LEADERSHIP AS A PREDICTOR OF THE PASS-FAIL CRITERION IN NAVAL AIR TRAINING. — Jour. Applied Psychol., 38 (3): 150-153. June 1954. DLC (BF1.J55, v. 38)

Essentially the same as item no. 1589.

2946

Hollander, E. P.

STUDIES OF LEADERSHIP AMONG NAVAL AVIATION CADETS. — Jour. Aviation Med., 25 (2): 164-170, 200. April 1954. DLC (TL555.A1A4, v. 25)

Studies were made to determine a criterion by which future naval leaders could be identified among cadets. Those cadets who were chosen by their fellows as informal leaders also showed significant officer-like qualities when rated by their instructors. The designation of peer nomination was given to a test by which the informal leaders were named by the other cadets of their group at the end of pre-flight training. In this study, it was determined that the two best predictors of flight performance were final pre-flight grades and the peer nominations. In fact, the peer nominations showed a higher correlation with subsequent leadership performance than did any other predictor method. A final evaluation of peer nominations as predictors was withheld, pending ultimate fleet performances of the cadets selected as informal leaders in pre-flight training.

2947

Holtzman, W. H.,
and S. B. Sells

PREDICTION OF FLYING SUCCESS BY CLINICAL ANALYSIS OF TEST PROTOCOLS. — Jour. Abnormal and Social Psychol., 49 (4): 485-490. Oct. 1954. DLC (RC321.J7, v. 49)

This study was undertaken to investigate the problem of developing a battery of personality and motivational measures for prediction of adjustment to military and combat flying. The success of predictions made and effective methods used by expert clinical psychologists on the basis of an experimental battery of personality tests were investigated within a controlled experimental setting. The chief objective was the development of hypotheses for a systematic, quantitative scoring of a group of experimental psychiatric screening tests for flying personnel. A sample of 50 cadets, who made a highly successful adjustment to flight training, and 50 cadets, who had to be eliminated because they developed overt personality disturbances during flight training were used as subjects. This sample was selected from a population of 1,504 subjects who had taken the experimental test battery consisting of six group adaptations of familiar individual diagnostic procedures. Analyses of predictions made on a global level or on a single-test level by nineteen recognized psychologists in the fields of psychodiagnosis revealed that the number of correct predictions did not exceed significantly that expected by chance alone. It is concluded that at present, clinical assessments of beginning aviation cadets have no relationship to a criterion of adjustment in the basic flight training program. The authors discuss possible explanations for these results and the trends observed in the clinical judgments.

2948

Hood, J. D.,
and C. R. Pfaltz

OBSERVATIONS UPON THE EFFECTS OF REPEATED STIMULATION UPON ROTATIONAL AND CALORIC NYSTAGMUS. — Jour. Physiol. (London),

124 (1): 130-143. April 28, 1954. DLC (QP1.J75, v. 124)

Nystagmic responses in rabbits subjected to repeated angular accelerations of low intensity (5°/sec.^{2} for a period of 10 sec. followed by a period of rotation at constant velocity for 60 sec.) underwent a marked decline which was dependent upon the number of stimuli applied. This response decline (R.D.) phenomenon was unaccompanied by any change in the latent period of the nystagmic response. The mechanism of the R.D. phenomenon is thought to be allied with habituation, wherein innate responses of the central nervous system to certain relatively simple stimuli, especially those of potential value as warnings of danger, wane as the stimuli continue for a long period without unfavorable results. The nystagmic responses to repeated monaural caloric stimuli (a flow of water at temperature of 25° C. for 10 sec. into the ear) did not undergo any significant decline, and the physiological independence of responses to rotational and caloric stimuli is discussed.

2949
Hoover, G. W. (Moderator)
HUMAN ENGINEERING IN THE AIRCRAFT INDUSTRY. — Skyways, 13 (4): 16-19, 34-39, 42, 44. April 1954. DLC (TL501.S634, v. 13)

This is a report on a panel discussion which brough out the need for a close working relationship between the human and design engineers and for better utilization of human engineering by the industry. The design engineer is confronted with a double problem: (1) to what extent factors such as buffeting and vibration should be controlled to limit the effects of fatigue, strain, and stress on the crew, and (2) the problem of design of the aircraft itself, including instruments and controls to facilitate the actual task of flying the airplane. Human engineering studies are a good source of data that will help resolve the above problems. The need for standardization of instrument design characteristics was emphasized. More courses in human engineering should be offered upon demand for training of engineers and psychologists in this field.

2950
Hoover, G. W.
PICTORIAL VS. SYMBOLIC INDICATION. — Skyways, 13 (1): 17, 39-40. Jan. 1954. DLC (TL501.S634, v. 13)

Studies of symbolic versus pictorial representation of data in the cockpit suggest that by using the latter approach, the time and cost of pilot training can be drastically reduced. Visual cues simulating the pilot's natural visual environment may help to stabilize the pilot's sense of balance and reduce instances of vertigo and confusion. Under such conditions the pilot's sense of balance is corrected by the visual information and he is free to concentrate on his mission. The additional cost of producing pictorial instruments might be offset by reduction in the over-all cost of instruments and training and by reduction in accidents attributed to pilot error during instrument flight.

2951
Howard, P.
THE SIGNIFICANCE OF THE CHANGES IN ARTERIAL BLOOD PRESSURE DURING PRESSURE BREATHING [Abstract]. — Jour. Physiol. (London), 123 (3): 36P. March 29, 1954. DLC (QP1.J75, v. 123)

Pressure breathing produces a rise in mean arterial blood pressure, the magnitude of which depends upon (1) lung elasticity and (2) the pooling of venous blood in the limbs. At high breathing pressures the latter is the more important, and enough blood may be pooled to cause circulatory collapse. Syncope may be prevented or delayed by applying a counter-pressure, equal to the breathing pressure, to other parts of the body. Measurements of mean arterial blood pressure with

different degrees of body coverage allow an assessment of the importance of various sites as venous reservoirs. The role of the reflex compensatory mechanisms in the elevation of blood pressure is discussed. (Quoted in full)

2952
Howes, D. H.
ON THE INTERPRETATION OF WORD FREQUENCY AS A VARIABLE AFFECTING SPEED OF RECOGNITION. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-282, June 1954. iv+12 p. (RDO no. 694-37). AD 43 066
PB 129575

Interpretations of the inverse relation between the duration for which a printed word must be exposed visually in order to be recognized and the frequency of occurrence of the word in a large general word count are examined critically. It is found that the most satisfactory interpretation is to regard the word's frequency in a word count as an estimate of its average probability of emission by the population of subjects used in the recognition experiment (base probability). Since the threshold of recognition is defined by the probability of emission of the word following its exposure, only a short exposure will be necessary to bring up to threshold criterion a word whose base probability is almost as great as the criterion probability, while a much longer exposure will be required for a word whose base probability is low. The critical assumption of this interpretation is that the frequency of a word in a large general word-count represents its average probability of emission by the experimental subjects used in the recognition experiment. Three experiments evaluating the validity of this assumption for the Lorge Magazine Count [based on a sample of 4.5 million words taken from issues of five popular magazines from 1928 to 1939] are described. (Author's abstract)

2953
Huard, P.,
P. Allehaut, and C. Chippaux
[TREATMENT AND EVACUATION OF WOUNDED OF DIEN-BIEN-PHU] Le traitement et l'évacuation des blessés de Dien-Bien-Phu. — Bulletin de l'Académie nationale de médecine (Paris), 138 (25-26): 404-407. Oct. 5-12, 1954. In French. DNLM

A brief discussion is presented on the organization of medical services and on the helicopter and Beaner aircraft evacuation of wounded from Dien-Bien-Phu. Difficulties encountered in aircraft landings due to the awkward terrain are noted, and the limitations of helicopter evacuation are mentioned including altitude restrictions, limited space for patient transport, and lack of speed in reaching destination.

2954
Hughes, H. M. 1952
DISCRIMINATORY ANALYSIS. X. ON TWO CORRELATED BIVARIATE NON-NORMAL DISTRIBUTIONS. — Univ. of Calif., Berkeley (Contract AF 41(128)-31); issued by School of Aviation Medicine, Randolph Field, Tex. April 1952. 19 p. (Project no. 21-49-004, Report no. 10). ATI 152 952. UNCLASSIFIED

Distributions useful in discriminatory analysis when the assumptions of normality are not satisfied are derived and discussed in detail. The distributions are particularly suitable for study of accidents and accident proneness, since they provide for different parameters for different types of accidents, and the parameters in turn may have any distribution of a very flexible system of distributions. (Author's abstract)

2955
(Human Engineering Lab.)
ORDNANCE ENGINEERING FOR TROOP OPERATIONAL FACTORS. — Aberdeen Proving Ground. Human Engineering Lab., Md. Quarterly Progress Report, Dec. 1953 to Feb. 1954 [issued

1954?]. 3+4 p. (Project no. TB1-1000).
AD 28 743 UNCLASSIFIED

The design of human tasks, man-machine systems, and specific items of man-operated equipment is being studied; the abilities and limitations of man are taken into consideration. The successful design of military equipment requires consideration of the following basic human characteristics: perceptual capacities, mobility and muscular strength, intellectual abilities, capacity for learning, intergroup and intragroup behavior, body dimensions, and effects of environmental factors upon human performance. Progress is reported for human engineering problems in an arctic environment, human engineering evaluation of 1/4-ton 4x4 utility truck (M38A1), gunner's controls on the M47 tank, steering wheel vs. steering levers in track-laying vehicles, drivers' positions in tanks, human-engineering evaluation of Stinger, driver evaluation of vehicles, ordnance-item survey, the effects of sound and vibration on man and his efficiency, and human-engineering activities in ordnance arsenals. (AD abstract)

2956
Ĭ Ankovskiĭ, V. D.
[REGARDING THE RESTORATION OF THE CENTRAL NERVOUS SYSTEM AND GASEOUS METABOLISM IN ANIMALS WHICH PERISHED FROM HYPOXIA AND WERE REVIVED WITH THE AID OF ARTIFICIAL BLOOD CIRCULATION] Do pytannia pro vidnovlennia funktsiĭ tsentralnoĭ nervovoĭ systemy i hazoobminu v tvaryn, shcho zahynuly vid hipoksiĭ i buly ozhyvleni za dopomohoiu shtuchnoho krovoobihu. — Medychnyĭ zhurnal (Kiiv), 24 (1): 46-55. 1954. In Ukrainian.
DLC (R91.M426, v. 24)

Final death of nerve cells in anoxia occurs not as the result of lack of oxygen, but, basically, because of the accumulation of products of cell metabolism formed in the course of clinical death and developed as the result of the consumption by the brain cells of the oxygen present in the blood vessels during the initial period of the clinical death condition, and because of the biochemical reactions which take place in the brain tissues after the blood circulation stops. Restoration of the function of the respiratory center by artificial circulation takes place in the presence of a low CO_2 content in the arterial blood; thereafter, respiration gradually improves, regardless of the increasing hypocapnia.

2957
Ĭ Arbus, A. L.
[A RESEARCH ON THE LAWS OF EYE-MOVEMENT IN VISION] Issledovanie zakonomernosteĭ dvizhenii glaz v protsesse zreniia. — Doklady Akademii Nauk SSSR (Moskva), 96 (4): 733-735. June 1954. In Russian.
DLC (AS262.S3663, v. 96)

English translation by E. R. Hope. Defence Scientific Information Service, Defence Research Board, Canada, no. T 149 R, October 7, 1954. [5] p.

Eye movements were recorded by means of a tiny suction cup equipped with a small mirror and placed on the sclera. The mirror reflected a beam of light and thus traced the movements of the eye on photographic paper or film. In examining an immobile object the eyes are either in a state of fixation — approximately 97% of the time with an average duration of fixation of 0.2-0.5 sec. — or in a state of rapid transfer from one point of fixation to another, approximately 3% of the time. Both the duration of the jump between two points and the maximum angular velocity of the eye depend on the visual angle between these two points. In horizontal jumps between two points, the jump duration was found to be independent of the subject's attempts to move more rapidly or more slowly. While following an outline of a stationary object, the eyes travel in very small jumps, which are not perceived as such by the subject. In vision transfer between two points at different

distances convergence takes less time than divergence. In all cases when two lines of equal length and at the same distance from the subject are perceived to be of different lengths, the eye movements in the process of judging the length are also different: the angle through which the eyes turn is greater for the line perceived to be longer. The amplitude of the eye movement (turning angle) in the process of estimating and comparing distances on a plane surface may be used as an objective index of how the observer is actually sensing and estimating these distances.

2958
Imber, B. M.,
I. D. Stern, and J. M. Vanderplas
VISUAL FIELD RESTRICTION AND APPARENT SIZE OF DISTANT OBJECTS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-23, Jan. 1954. iv+12 p. (RDO no. 696-67). AD 27 682 PB 114065

Four observers made judgements comparing the apparent size of a variable-sized white square, set at a distance of 500 feet and viewed monocularly through an aperture, with the apparent size of a standard 20 inch square, viewed binocularly at a distance of 30 feet. Aperture sizes from 5 to 60 degrees were used to restrict the visual field. The psychophysical Method of Constant Stimuli was used as a sensitive measure of the effects of aperture size on the apparent size of the distant objects. The results indicate that no consistent decrease in apparent size results from visual field restriction per se. It was found that a slight (2%) but consistent increase in apparent size occurred with all apertures used, but this effect was not found to be correlated with aperture size. It is hypothesized that slight over-estimation of distance by the observers under the conditions of the study may have resulted in the apparent size increases found. It is suggested that factors inherent in optical systems may account for the large decreases in apparent size found when telescopes or periscopes are used. (Authors' abstract)

2959
Ingle, D. J., 1953
R. C. Meeks, and L. M. Humphrey
EFFECTS OF EXPOSURE TO COLD UPON URINARY NONPROTEIN NITROGEN AND ELECTROLYTES IN ADRENALECTOMIZED AND NONADRENALECTOMIZED RATS. — Amer. Jour. Physiol., 173 (3): 387-389. June 1953. DLC (QP1.A5, v. 173)

Both normal and adrenalectomized rats (the latter receiving 4 ml. of adrenal cortical extract daily) exhibited the same general pattern of response to cold and of recovery at normal temperature. During exposure to cold (as low as 1°C.) the rats lost weight and excreted increased amounts of nonprotein nitrogen and K. These changes were reversed when the temperature was elevated to 26°C. When the temperature was elevated from 1° to 26°C., all of the rats showed a sharp increase in weight and a decrease in sodium and chloride excretion. This response lasted for only 24 hours. The metabolic responses to cold, which occurred in the absence of the adrenal glands, must represent extra-adrenal regulatory mechanisms. (Authors' summary, modified)

2960
Ironmonger, J. G.
CANOPY TEMPERATURE SURVEY ON AN F-86A AIRPLANE. — Wright Air Development Center. Directorate of Flight and All-Weather Testing, Wright-Patterson Air Force Base, Ohio. Technical Note no. WCT-53-65, Jan. 8, 1954. 6 p., 8 tables (RDO no. 453-303). AD 24 580 UNCLASSIFIED

Canopy temperatures were measured during night flights in an F-86A airplane at altitudes ranging from 3000 to 40,000 ft. at various air speeds. Iron-constantan thermocouples were placed on the outer and inner surfaces

of the canopy and of the windscreen and one on the outside of the cockpit. A servo temperature indicating system was used to obtain the canopy temperatures. For most of the altitudes, the cabin temperature remained fairly constant. At 3000 ft., however, there was considerable variation in cabin temperatures with changes in air speed. Free-air temperature was corrected for adiabatic compression. A maximum temperature rise of 39°C. was obtained at the forward outer surface of the canopy at 3000 ft. and a true air speed of 535 knots. The cockpit heating system added to the normal adiabatic temperature. A temperature drop of less than 1°C. through the canopy was recorded by an instrumentation system accurate to ±1°C. (AD abstract, modified)

2961

*Ivanov, K. P. 1953

[EFFECT OF LIGHT INTENSITY ON METABOLIC RATE OF MONKEYS] Vliianie intensivnosti osveshcheniia na gazoobmen u obez'ian. — In: Opyt izucheniia reguliatsii fiziologicheskikh funktsii v estestvennykh usloviiakh sushchestvovaniia organizmov. Izdatel'stvo Akademii Nauk S.S.S.R., Moskva-Leningrad: 1953, p. 94-101. In Russian.

Tests were made with 11 lower monkeys 2-5 years old. Oxygen consumption determinations were made in tightly closed chambers provided with glass walls. A lowering of the intensity of light resulted in a 4-11% reduction of the gaseous metabolism rate. It was also demonstrated that in different species of monkeys light enhanced the intensity of the oxidation processes at different degrees. This the author regarded as an expression of different species characteristics manifested under conditions of natural habitation. Studies were made of the effect of light intensity on two specimens of Macacus rhesus. The highest rate of gaseous metabolism was observed during the morning hours; the rate receded towards the hours of twilight. At night, during the darkest hours, some rise in the rate of gaseous metabolism was observed as compared with the metabolic rate of twilight hours. Artificial periods of day were created by artificial reduction in natural light intensity in the test chambers. Results of such tests indicated that, regardless of the natural period of the day, artificial reduction in intensity of light affected the rate of gaseous metabolism in a manner identical to natural reduction in light intensity during twilight or natural night hours. The authors regard twilight as a "signal type" of stimulation inhibition, which signifies a state of transition from daylight activity to night rest. The natural conditioned reflex stereotype was formed under the influence of natural conditions as regards habitat and diurnal cycle to such a degree as to fix or establish the total picture of daily periodicity of the physiological functioning of the organism in harmonious response to the stereotype optical stimulator. (Referativnyi zhurnal, Biologiia, 1954. Abstract No. 15497.)

2962

Ivanov, K. P.

[THE NEURO-MECHANISMS OF RESPIRATION AND OF BLOOD CIRCULATION REACTIONS TO LOWERED BAROMETRIC PRESSURE IN AMPHIBIA] O nervnykh mekhanizmakh reaktsii dykhaniia i krovo-obrashcheniia na ponizhennoe barometricheskoe davlenie u amfibii. — Fiziologicheskii zhurnal S.S.S.R. (Leningrad), 40 (3): 310-315. 1954. In Russian.

DLC (QP1.F57, v. 40)

Despite the fact that frogs are able to tolerate a high degree of oxygen insufficiency, they manifest changes in respiratory movements, cardiac activity, and latent period of skin reflex response at a slight lowering of the oxygen tension in the air. The effects of hypoxia in frogs under conditions of lowered barometric pressure are accompanied by a gradual inhibition of the skin reflexes and by characteristic periodic movements of respiration and of cardiac activity. These manifestations in

hypoxia are related to the overextension of the effects of inhibition, emanating from the higher centers of the central nervous system (medulla) into the bulbar and spinal centers.

2963

IUsfin, A. I., 1953

B. S. Frantsen, and G. H. Rautian [EFFECT OF HYPOXIA ON COLOR VISION] Vliianie gipoksii na tsvetnoe zrenie. — Doklady Akademii Nauk SSSR (Moskva), 92 (6): 1153-1156. 1953. In Russian. DLC (AS262.S3663, v. 92)

English translation by E. R. Hope. Directorate of Scientific Information Service, Defence Research Board, Canada, no. T 324 R, March 1959. [6] p.

Experiments on the effect of hypoxia on color discrimination were conducted on 25 subjects in a decompression chamber, with the aid of a newly developed anomaloscope, which permits a qualitative determination of thresholds of each of the three systems of retinal color-sensing receptors (cones). At high altitudes (5000 m.) color discrimination was depressed —in varying degrees for each receptor—in proportion to the discrimination acuteness at sea level. The strongest depression at altitude appeared in that receptor which was the most sensitive on that particular day at ground. In most cases at low altitudes (2000-3000 m.) an improvement of color discrimination was observed for one or two of the receptors. Most frequently this was the second receptor (green-sensing), less frequently the third (blue-sensing), and still more rarely the first receptor (red-sensing). At 3500-4000 m. altitude depression set in. The receptors which had exhibited an increase in acuteness of color discrimination at low altitudes were least affected by the depression. Oxygen inhalation at high altitudes restored color discrimination to all three receptors almost to the initial level.

2964

Izard, C. E.,

and J. H. Manhold

CORRELATES OF PEER LEADERSHIP RATINGS. I. MEDICAL COMPLAINTS. — Tulane Univ., New Orleans, La. [Contract Nonr-47502]; issued by Naval School of Aviation Medicine, Pensacola Fla. Joint Project Report no. 5, April 27, 1954. 8+2 p. (Project Report no. NM 001 077.01.05). AD 35 239

UNCLASSIFIED

This is the first in a series of studies designed to determine some of the personality or behavioral correlates of peer leadership ratings. The present hypothesis was that peer leadership ratings are positively related to health. Eight-month cumulative medical histories were obtained for 1080 Naval Aviation Cadets. A preliminary analysis showed that a group selected on the criterion of five or more medical complaints had a significantly lower mean peer leadership rating than did the cadet population. This criterion group was reliably classified into a "psychosomatic" and "non-psychosomatic" subgroup. Analysis of the data for these sub-groups supported the conclusion that it was the "psychosomatic" classification and not simply frequency of medical complaints that measured an important correlate of peer leadership ratings. (Naval School of Aviation Medicine abstract)

2965

*Izbinskiĭ, A. L. 1953

[CHANGES IN GASEOUS METABOLISM UPON TOTAL COOLING OF WARM-BLOODED ANIMALS] Izmeneniia gazoobmena pri obshchem okhlazhdenii teplokrovnykh zhivotnykh — In: Opyt izucheniia reguliatsii fiziologicheskikh funitsiĭ v estestvennykh usloviiakh sushchestvovaniia organizmov, p. 1, 9-18. Moskva-Leningrad: Izdatel'stvo Akademii Nauk SSSR, 1953. In Russian.

Izbinskiĭ studied processes of gaseous metabolism in white rats under conditions of extreme hypothermia, which was attained by placing the experimental animals into tightly closed chambers at -3° to -5°C.; simultaneously a section of the animals' dorsum was moistened with water of 8°-10°C.; this resulted in

the death of the animals within an average of 3 hours. When a comparatively large part of the animals' surface was similarly moistened with water, the animals died within 30 to 60 minutes. The rate of oxygen consumption in the control tests was constant, averaging 48.6 ml. per kg. per minute. The first fall in body temperature from 37° to 32° and 31° C. was accompanied by an increase in the intensity of the processes of oxidation by 50-80% and by a more lively motor activity. In the second phase of fall in body temperature from 31° to 29° and 27° C. the rate of oxygen consumption exceeded the original rate by 100 to 200%. Usually 31°-29° C. represented the crest of the curve of chemical thermoregulation, when motor activity reached its maximum and a slight tremor became manifest. In the third hypothermic phase, when the body temperature was reduced from 27° to 20°-19° C., the rate of oxygen consumption fell to its original level and the animals' mobility and tremor came to a standstill. In the fourth hypothermic phase, when the animals' body temperature was reduced from 19° to 12° and 10° C., the rate of gaseous metabolism fell to 18% of the original. The animals became immobile, and return to normal condition could only be brought about by artificial means. No increase in the rate of oxygen consumption was observed in animals whose body temperature was reduced at a rapid rate. Izbinskiĭ concludes that during the period of lowering the animals' body temperature to 20°-19° C., the rate of metabolic processes was not related directly to the body temperature, but depended upon the activity of the central thermoregulating apparatus. Complete disturbance of chemical thermoregulation occurred only when all life activities of the organism were brought to a standstill, which usually occurred when the body temperature was lowered to 18°-17°C. (Referativnyi zhurnal, Biologiia, 1954. Abstract No. 14590)

2966
Jayle, G. E.,
R. Camo, and J. Ansaldi
[CINEMATOGRAPHIC EXPLORATION OF NIGHT VISION. COMPARATIVE VALUE OF SENSORY AND PSYCHO-SENSORY THRESHOLDS] L'exploration cinématographique de la vision nocturne. Valeur comparative des seuils sensoriels et des psycho-sensoriels. — Revue d'oto-neuro-ophthalmologie (Paris), 26 (2): 93-98. 1954. In French. DNLM

The examination of night vision by a cinematographic method which permits the measurement of sensory and psychosensory thresholds is described. This method demonstrates that a subject with defective night vision may have normal light perception and one with normal night vision may have abnormally elevated light perception. It is also noted that abnormal nocturnal light perception does not denote abnormal night vision.

2967
Jayle, G. E.,
G. Blet, and R. Camo
[A NEW METHOD TO STUDY NIGHT VISION: CINEMATOGRAPHIC METHOD] Une nouvelle méthode d'exploration de la vision nocturne: la méthode cinématographique. — Médecine aéronautique (Paris), 9 (2): 163-166. 1954. In French. DLC (TL555.M394, v. 9)

To test night vision (visual acuity at very low illumination) the author uses a moving picture projected at variable brightness. The thresholds that may thus be tested are: the absolute threshold of light perception, perception of motion, thresholds of recognition ("a human figure") and identification (a certain person), as well as time factors. These data may be plotted on a graph which reflects the perception pattern of a subject much better than the classical (stationary) tests.

2968
Jenkins, W. L.,
and A. C. Karr
THE USE OF A JOY STICK IN MAKING SETTINGS ON A SIMULATED SCOPE FACE. — Lehigh Univ., Bethlehem, Pa. (Contract AF 18(6000)-24); issued by Wright Air Development

Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-430, March 1954. iii+7 p. (RDO no. 694-17). AD 35 165 PB 114768

Also published in: Jour. Applied Psychol., 38 (6): 457-461. Dec. 1954. DLC (BF1.J55, v. 38)

A series of experiments were performed to determine the significance of certain variables in the use of a joy stick to make settings in two dimensions on a simulated scope face. For making settings to a coarse tolerance (0.1 in.) and with the display 24 in. from the operator's eyes, the most important factor is the ratio of the movement of the tip of the joy stick to the movement of the cursor. For the fastest setting time, the lowest variability, and the fewest missettings, the tip of the joy stick should move at least 2.5 times as fast as the cursor. Other variables are relatively unimportant. Joy-stick lengths from 12 to 30 in. were found equally effective, although most subjects preferred the 24-in. length. Reversed operation (the cursor moving down when the stick is pushed away) was slightly slower, but the optimal ratio was the same. The position of the subject's switch was regarded as unimportant; operations by hand and foot pedal were about equal. These results were obtained in a situation where the movement of the joy stick was translated directly into the movement of the cursor; the apparatus did not permit tests of the pressure-controlled type. (AD abstract)

2969

Jensen, J. J.,
J. H. Hill, A. I. Siegel, and D. Courtney

THE DEVELOPMENT OF A JOB SAMPLE TROUBLE-SHOOTING EXAMINATION. — Institute for Research in Human Relations, Philadelphia, Pa. Progress Report, Jan. 15, 1954. viii+30 p. AD 26 472 PB 135387

An aviation electricians (AE) job sample trouble-shooting examination was constructed in four parts corresponding to the four steps necessary to locate by system analysis and remedy the cause of electrical discrepancies. This project also developed and pretested a pool of over 600 items which may form the basis for the AE written examination, the purpose of which is to predict a trouble-shooting criterion. These items were administered to 399 aviation electricians on both the East and West Coasts. The results from this test administration were analyzed. On the basis of this analysis, the pool of items was reduced to 351 items to be considered for validation against the job sample trouble-shooting criterion. (AD abstract)

2970

Jensen, M. B.,
and John Schmid

AN ANALYSIS OF SOME CLINICAL JUDGMENTS ON MALE BASIC AIRMEN WHO FAILED THE GROUP PSYCHOLOGICAL TESTS. — Jour. Clin. Psychol., 10: 325-332. Oct. 1954. DLC (RC321.J74, v. 10)

An analysis was made of the data used in judging whether 600 men who failed the group psychological test batteries, AC-1B and AFQT, should be retained or discharged from the Air Force. A combination of 16 variables was used as a criterion for retention or discharge: 8 objective measurements, and 8 subjective ratings of adjustment to different factors. Regression analysis showed that only four of the 16 variables contributed substantially to the variability of the criterion (74% of the total variability). These were ratings of emotional adjustment, motivation for Air Force duty, Air Force adjustment, and behavior in examination. Three examiners independently estimated what each variable contributed to the criterion. Their agreements with the statistical analysis and with each other were low. They were unable to agree what variables should be used in recommending a man for discharge or

retention. However, they agreed highly as to which men should be retained or discharged. A bifactor analysis of the intercorrelations of all 16 variables and the criterion revealed no definite structure. Bifactor analysis of the intercorrelation of the 8 subjective ratings and the criterion revealed four definable group factors and one large general factor. 62% of total variability of these 9 ratings was accountable by one general factor. Conclusions reached were that judgments on acceptable degree of mental fitness for Air Force duty probably involve relatively few discrete processes, even when many variables are available. (Amer. Psychologist, 9 (8): 399. Aug. 1954. Abstract, modified)

2971
Jerison, H. J.
PACED PERFORMANCE ON A COMPLEX COUNTING TASK UNDER NOISE AND FATIGUE CONDITIONS [Abstract]. — Amer. Psychologist, 9 (8): 399-400. Aug. 1954.
DLC (BF1.A55, v. 9)

This experiment was specifically concerned with a subject's ability to keep track of a series of ongoing events under conditions of noise and quiet. The subjects, 24 male undergraduates, were divided into an experimental group consisting of 12 subjects who worked for 1 hour of the 2 hour period in white noise (110 db), and a control group of twelve subjects who worked in relative quiet. The task was to maintain three different counts simultaneously. This was effected by having the subjects observe three lights flashing R_i times per minute and to have them press a key under a particular light every Nth time the light flashed. The following results were obtained: (a) there were statistically significant error increments with time; (b) errors for the longest count (N = 10) and for the slowest light (R = 4.5) were most frequent and increased most rapidly with time; (c) a statistically significant difference in favor of the control group was found, the three lights being differentially effective in distinguishing between performances of the two groups; (d) a trend was observed indicating that the groups became differentiated during the second half hour of performance under noise. It was concluded that the ability to keep a "mental count" deteriorates more in noise than in quiet. The deterioration may result from an increased "fatiguing rate" induced by the stress of noise or from a primary effect of noise itself. Result (b) indicates that longer temporal intervals between events make the task more susceptible to fatigue and noise, and suggests that a memory function may be involved. (Abstract, modified)

2972
Johansen, H.
[HEARING AND NOISE] Hørelse og støj. — Militaerlaegen (København), 60 (3): 69-81. Sept. 1954. In Danish.
DLC (RC970.D3, v. 60)

The effects of noise in various frequency and intensity ranges on hearing acuity are reviewed from the viewpoint of military medicine. Particular attention is given to the clinical symptoms of hearing impairment and its etiology in soldiers and occupational groups, as well as to examination methods, treatment, and prophylactic measures. Different types of ear defenders and their use under field conditions are discussed.

2973
Johansen, H.,
and P. Kreutzfeldt
[EXAMINATION OF HEARING IMPAIRMENT IN DANISH DRAFTEES AS A RESULT OF SHOOTING, AND EXPERIMENTS WITH DIFFERENT FORMS OF EAR PROTECTORS] Undersøgelse af hørebeskadigelser hos danske vaernepligtige opstaede efter skydning, samt forsøg med forskellige former af ørebeskyttelse. — Militaerlaegen (København), 60 (2): 90-96. Sept. 1954. In Danish.
DLC (RC970.D3, v. 60)

On the basis of a review of the literature, and referring to their own hospital experience and research, the authors advocate the use of ear protectors during exercises on the shooting ranges for all three branches of the Danish defense. The most suitable ear protector for this purpose was found to be the "Audium" plastic prop ear defender manufactured in Holland.

2974
Johnson, L. C.
SPEED AND CONFIDENCE OF JUDGMENT AS PSYCHOLOGICAL VARIABLES. — Stanford Univ., Stanford, Calif. (Contract Nonr 225 (01)); issued by Office of Naval Research, Wash. D.C. Technical Report no. 4, June 1, 1954. iv+[39] p. (NR 150-087). AD 35 051 PB 117858

An investigation was made of the generality of speed and confidence by intercorrelating the decision time scores of 7 tasks and the confidence scores on 6 tasks. The tasks required subjective and objective type judgments. Findings show that speed and confidence in one task are significantly associated with speed and confidence in another. Greater speed of decision among the subjects was found to indicate greater confidence in the adequacy of their judgment. Stated confidence and behavioral confidence were not significantly related. An investigation was also made relating a total score of decision speed and a total score of confidence to certain personality measures: manifest anxiety, ego-control, authoritarianism, and achievement; no relationships were found. In general, the results show that speed and confidence are general and measurable aspects of behavior and thus are useful as reference dimensions in the study of judgment and choice. (AD abstract)

2975
Johnson, W. H.
SENSORY AND MOTOR RESPONSES RESULTING FROM SEMICIRCULAR CANAL STIMULATION [Abstract]. — Revue canadienne de biologie (Montreal), 13 (5): 475. Dec. 1954. In English. DLC (QH301.R47, v. 13)

Vestibular stimulation produced by superimposing angular acceleration of the head to another angular acceleration in a plane at right angles to the first results in vertigo and a high incidence of nausea.

2976
Jolly, R. 1952
[CONTRIBUTION TO THE STUDY OF ELECTROENCEPHALOGRAPHIC MODIFICATIONS DURING HYPOCAPNIC ANOXEMIA] Contribution à l'étude des modifications électroencéphalographiques au cours de l'anoxémie hypocapnique. — (Thesis, Université de Paris) 90 p. Paris: R. Foulon, 1952. In French. DNLM

The following is concluded from a study of electroencephalographic tracings registered during hypocapnic anoxia: (1) EEG changes appear in chronological order (inconsistent alpha rhythm, irregular bradycardia at beta band, and slow, nonrhythmic delta wave); (2) the precocious appearance of the delta wave, which preceeds syncope, is related to individual factors and not the level of blood O_2 saturation, and (3) EEG permits verification of the action of certain substances (glucose, Centropnein, rutin, vitamin C) on the resistance to anoxemia.

2977
Jones, Marshall B.
ASPECTS OF THE AUTONOMOUS PERSONALITY. II. INTOLERANCE OF FLUCTUATION, PART I; III. MANIFEST RIGIDITY; AND IV. TRAITS FROM THE GUILFORD-ZIMMERMAN TEMPERAMENT SURVEY. — Naval School of Aviation Medicine, Pensacola, Fla. Jan. 11, 1954. 11+7 p. Project Report no. NM 001 058.25.16). AD 35 221 UNCLASSIFIED

The first of these studies [on Naval Aviation Cadets] reports a significant,

negative correlation between the California F Scale and rate of fluctuation in the Necker Cube. The second study reports a significant positive relationship between the California F Scale and the Wesley Manifest Rigidity Scale. The third study reports significant positive correlations between the California F Scale and four scales, two of anxiety and two of hostility, in the Guilford-Zimmerman Temperament Survey. (Naval School of Aviation Medicine abstract)

2978

Jones, Marshall B.

TWO CORRELATES OF INTOLERANCE OF FLUCTUATION. – In: (Naval School Aviation Med.), 1954. Miscellaneous tests and minor evaluations, p. 21-24. Pensacola, Fla. April 20, 1954. (Project Report no. NM 001 058.25.08). AD 50 299(e)

UNCLASSIFIED

Naval Aviation cadets with at least 2 years of college experience were subjected to the Necker Cube rate of reversal test. The Necker Cube was presented (1) on printed sheets which were distributed among the cadets and (2) as a drawing on a board which was held before the subjects. The cadets were instructed to fix the cube with a steady gaze and to try, through an effort of the will alone, to make it fluctuate. The Necker Cube was exposed for two 15 second intervals during which the subjects counted the number of reversals they experienced. The sum of the two counts was the subject's score. Many of the cadets had also been subjected to the Hidden Figures test (Guilford, J. P., Army Air Forces Aviation Psychology Program, Report no. 5. p. 432-434, 1947) and the Wesley Manifest Rigidity Scale (Wesley, E. S. J., Perseverative Behavior in a Concept Formation Task as a Function of Manifest Anxiety and Rigidity and of Punishment, Ph.D. Thesis, State Univ. of Iowa, 1954). Rate of reversal in the Necker Cube was related to the Hidden Figures test. The relationship between rate of reversal and the Manifest Rigidity Scale was weaker. The results support the view that rate of reversal in the Necker Cube may be regarded as a measure of perceptual rigidity. (From the AD abstract)

2979

Jones, T. G.

BINOCULAR VISION: SOME ASPECTS IN RELATION TO AVIATION. – Aero Med. Soc. Jour. (New Delhi), 1 (1): 57-61. April 1954. DNLM

Emphasis has shifted from ocular muscle balance to good visual acuity as the most important factor in stereopsis. On landing a plane, it is mainly by good vision that one-eyed pilots interpret all monocular clues available in terms of depth. Therefore it is necessary to maintain high visual standards for pilots. Heterophoria affects the spatial judgment only when it is not fully compensated. The degree of heterophoria is not as important as the power of fusional control, sufficient to withstand the stress and strain of service flying. It is possible that, in addition to visual-sensory elements, certain neurological and psychological factors account for differences in degree between individuals in the accuracy of their spatial judgment. Individual differences in selection of different clues or interpretation of collected data may lie at the perceptual level of the visual cortex. (Author's summary, modified)

2980

Jongbloed, J.

[THE TASK OF AVIATION MEDICINE] De taak van de luchtvaartsgeneeskunde. – Aeromedica acta (Soesterberg, Netherlands), 3: 11-16. 1954. In Dutch. DNLM

Aviation medicine had its origin in 1916, when during World War I it became necessary to establish criteria for the selection of volunteer pilots after it was recognized that indiscriminate acceptance of all volunteers for flying had resulted in costly losses of men and equipment. The demand

for suitable selection procedures induced systematic studies of specific factors involved in flying, and this, in turn, resulted in the creation of a specialized field of medicine. Selection of flying personnel still remains the primary task of military aviation medicine. In this it differs from commercial aviation medicine where problems related to passenger comfort are comparatively more important. The author reviews briefly the general physiological and psychological problems confronting man in flight. It is advocated that the age limit for pilots be based on functional age rather than chronological age. Personal background and habits of each individual are the determining factors in the preservation of physical and mental fitness. The use of decompression chambers for altitude training should be explored further. With the advent of space flight, the study of human factors in space environment should be included in the scope of aviation medicine as a logical outgrowth.

2981
Jonge, T. E. de
[THE PLACE OF DENTISTRY IN AVIATION MEDICINE] De plaats der tandheelkunde in de luchtvaartgeneeskunde. — Aeromedica acta (Soesterberg, Netherlands), 3: 63-67. 1954. In Dutch, with English summary (p. 67). DNLM

In so far as aerodontalgic complaints or deficiencies interfere with and are detrimental to the pilot's flight performance, dentistry in its preventive and selective aspects constitutes a pertinent field of aviation medicine. In addition, as early as 1918, there have been proposals to utilize odontological information for identification purposes in post mortem examinations. The following implementations to existing dental requirements for pilots in the Netherlands have been proposed: (1) presence of at least 20 points of contact (24 teeth) of natural teeth or of an adequate immovable prosthesis; (2) absence of acute or untreated caries or periapical infections; (3) absence of progressive caries or paradentosis expected to cause a premature loss of a major portion of teeth before the age of thirty; and (4) absence of pathological deviations of teeth and jaw or of structural deficiencies which might cause such at a later date. The author discusses in detail reasons for the need of this stringent interpretation of existing requirements.

2982
Juvenelle, A. [A.], 1953
B. Norberg, J. Lind, A. Bergstrand, and C. Wegelius
[BIOCHEMICAL OBSERVATIONS ON THE DOG IN DEEP HYPOTHERMIA] Observations sur la biochimie du chien en hypothermie profonde. — Journal de physiologie (Paris), 45 (4): 633-654. 1953. In French. DNLM

Death in the non-hibernating, anesthetized and cooled mammal is caused by ventricular fibrillation. The animals showing fibrillation can be kept alive by reduced artificial circulation sufficient for their minimum metabolic needs. The variation of several blood elements (blood sugar, amylase, hematocrit, pH, electrolytes, urea, etc.) were examined during cooling and rewarming. These variations were comparable to those demonstrated in hibernating animals and were reversible. The authors conclude that death caused by cold is due to the combined action of a cardiac metabolic alteration and a disorder of the autonomous nervous system of the heart (excitation and conduction).

2983
Juvenelle, A. A.
OBSERVATIONS ON HYPOTHERMIA. — Proc. Roy. Soc. Med. (London), 47 (6): 410-415. June 1954. DLC (R35.R7, v. 47)

In order to induce cooling in a non-hibernating animal, shivering has to be suppressed and consciousness obliterated. Since the effects of shivering-blocking agents differ at low body

temperatures, the least toxic, rapidly eliminated agent is preferable. Though far from perfect, ether possesses an advantage over barbiturates, as the latter are poorly eliminated by a cold animal, and because summation of repeated injections of the drug during cooling is possible. The author defines deep hypothermia as cooling of the whole body from 25°C. downwards. Below 20°C., there is no need for anesthesia. Experimental evidence indicates that oxygen consumption is reduced parallel to the drop in rectal temperature. Thus, the O_2 uptake may serve as an indicator of tissue metabolism. The author believes that energy expenditure in ventricular fibrillation may be compared to normal work, provided the coronary circulation is supplied with fully oxygenated blood during fibrillation. With artificial circulation supporting a non-breathing hypothermic animal, the ventricular fibrillation lasted for 5 hours. After rewarming over the period of a few days, the ECG and EEG became identical to pre-hypothermic recordings of the same animal. Futhermore, the author has observed that, if antihistaminics are given prior to hypothermia, blood pressure during hypothermia is preserved at a much higher level than in unprepared dogs. Biochemical changes in hypothermia are reversible and comparable to changes observed in the hibernating animal. However, the differences between a normally hibernating animal and hypothermic animal maintained by artificial circulation are too great for an indiscriminate comparison. The author discusses specific types of surgical cases who would benefit from hypothermia. Several accounts of cases where other shivering-suppressing drugs have been used are included.

2984
Kafka, M. M.
PASSENGER AND PILOT EAR PROBLEMS IN AIRCRAFT FLIGHT. — Med. Times, 82 (7): 439-445. July 1954.
DLC (R11.M8558, v. 82)

When the modern commercial aircraft was pressurized it helped to reduce the occurrence of aerotitis. Fighter aircraft as well as jet planes descend so fast that the ears must be constantly ventilated in order to prevent the obstruction of the eustachian tube orifice. Aerotitis media occurs more often at lower altitudes; and a given change in altitude involves increasing differences in pressure as one descends towards sea level. In most instances of acute aerotitis media symptoms are mild, pain diminishes early, and either no treatment or a minimum of conservative treatment may be essential. In the very severe types the abatement of pain is most important. Early treatment assures better results. The most ideal manner of relief, where possible, is to have the aircraft reascend to the level at which greater aeration is possible, which can then be followed by slower descent. Where this is not possible it is better to use vasoconstrictor medication followed by catheterization. When the pain is very severe it is best to use sedation for about twenty-four hours or so. Sometimes when the pain is very severe narcotic medication may be employed (Author's summary)

2985
Kafka, M. M.
WHAT THE GENERAL PHYSICIAN SHOULD KNOW ABOUT AVIATION MEDICINE. — Jour. Aviation Med., 25 (6): 689-693. Dec. 1954.
DLC (TL555.A1A4, v. 25)

This is a generalized presentation of certain abnormal conditions which are more prevalent among individuals engaged in aviation activities than among the total population. The author advises the general practitioner to become more familiar with aeromedical conditions, as he feels that their importance will increase with the growth of private flying. Among the more important conditions mentioned are: air sickness, anoxia, chronic fatigue, various psychological stresses, visual

and auditory changes, or diseases aggravated by high altitudes. Circulatory and heart ailments require special attention. The problem of aging is discussed, and the most important point to be considered is that of age at which experience fails to compensate for psychological and physiological deterioration. The general physician is urged to consider possible side reactions arising from use of drugs and antibiotics. The applicant for a private pilot's license who has any organic disease should be disqualified; diabetes is especially dangerous. Any acute or chronic disease of the respiratory tract should be sufficient cause for temporary suspension of flight activity. The age group which has the highest number of accidents, according to the Civil Aeronautics Administration, is the group between 30 and 40 years of age. The accident rate varies in an inverse proportion to the number of flying hours an individual pilot has accumulated.

2986
Kalser, M. H.,
T. M. Lin, G. Roback, L. Pevsner, H. K. Ivy, P. K. Moon, and A. C. Ivy
BONE MARROW AND CUTANEOUS CIRCULATION DURING DECOMPRESSION. — Univ. of Illinois Aeromedical and Physical Environment Lab., Chicago (Contract AF 33(038)-14306); and School of Aviation Medicine, Randolph Field, Tex. August 1954. 19 p. (Project no. 21-23-019, Report no. 6). AD 52 666 PB 115803

An investigation was made to determine bone marrow and cutaneous circulatory pressures in anesthetized dogs during decompression to simulated high altitudes (without hypoxia) and the influence of the sympathetic nerves on these changes. Normally, the bone marrow pressure varies from 12/8 to 117/96 mm. Hg with no correlation with the carotid arterial pressures. There was no change in systemic blood pressure with decompression, but there was a direct relation between decompression and the fall in bone marrow pulse pressures. Unilateral sympathectomy resulted in a significant improvement of bone marrow pressures during decompression as well as significantly higher skin temperatures of the toes and forelegs when compared with the control legs. Decompression, without hypoxia, causes a fall in the skin temperature of the toes and forelegs. This fall in the skin temperature is presumably due primarily to an increased sympathetic tone of the cutaneous blood vessels, and may also be the result of the liberation of a small amount of adrenalin. (School of Aviation Medicine abstract)

2987
Kameda, N.,
S. Onodera, K. Fujita, and Y. Miyamura
(AN INVESTIGATION OF LIGHT PLANE PILOT FATIGUE OF N.S.F. (Report no. 1)). — Japanese Safety Forces Med. Jour. (Tokyo), 1 (1): 32-38. March 1954. In Japanese, with English summary (p. 38).
DNLM (W1H0455, v. 1)

In an attempt to counteract fatigue in pilots flying light planes, a medical examination was carried out at the Hamamatsu flight school of the N.S.F. in April, 1953. It was found that, many pilots complained of body fatigue, poor appetite, insomnia, joint and teeth pain, and otic disturbances upon termination of flights. In some cases an abnormal deviation of the flicker discrimination threshold was noted. It became clear that pilot fatigue was accompanied by slight fatigue of the central nervous system. (Authors' summary, modified)

2988
Kameda, N.,
U. Doi, and Y. Miyamura
(STUDIES ON AVIATION FATIGUE AMONG THE N.S.F. LIGHT AIRCRAFT PILOTS (Report no. 2)). — Japanese Safety Forces Med. Jour. (Tokyo), 1 (2): 38-42. April 1954. In Japanese, with English summary (p. 42).

DNLM (W1H0455, v. 1)

It is suggested that most of the fatigue noted in light plane pilots was caused by an "imbalance" of the autonomous nervous system during flight. Drugs, such as multivitamin tablets (two tablets/day internally), 20% dextrose solution, or 2% calcium chloride solution (20 cc./day intravenously) daily for 2-3 days after flying produced no observable effect. (Authors' summary, modified)

2989

Kanter, G. S.

THE EFFECT OF HEAT ON THE REGULATION OF BODY FLUIDS AND ELECTROLYTES IN DOGS. — Albany Medical Coll., N. Y. (Contract AF 18 (600)-612); issued by School of Aviation Medicine, Randolph Field, Tex. July 1954. 8 p. (Project no. 21-1202-0002, Report no. 1). AD 41 509 PB 115295

Various constituents of the plasma and urine were determined in dogs before and after single or repeated exposures to air temperatures of 44° to 48° C. for several hours. Urinary sodium and chloride concentration first increased, then decreased during high temperature exposure; the final output and concentrations were below the levels in the plasma. Potassium excretion, on the other hand, was elevated; the final potassium level in the urine was considerably higher than the plasma level. The rate of weight loss amounted to 1.5% body weight per hour. Upon extended exposure the loss of water was very marked, from both the extracellular and intracellular fluids. Arterial pH and urine pH increased during exposure and the bicarbonate level decreased.

2990

Kark, R. M.

STUDIES ON TROOPS IN THE FIELD. — In: Spector, H. and M. S. Peterson, (ed.), Nutrition under climatic stress..., p. 193-195; discussion, p. 200-203. Nat. Acad. of Sci. — Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 UNCLASSIFIED

The findings of field studies on nutrition during World War II are reviewed. Further research on nutritional problems, such as false ketonuria and ketonuria in cold, uncovered in these field studies is needed. One avenue of research in nutrition is to find a way for man to rapidly mobilize body fat stores as a ready source of energy, e.g., by pharmocological and endocrinological investigations on the mobilization of body fat. Suggestions are made on the organization of such research through a central field nutrition unit.

2991

Kark, R. M.

SUMMARY REMARKS. — In: Spector, H. and M. S. Peterson, (ed.), Nutrition under climatic stress...., p. 156-165; discussion, p. 165-167. Nat. Acad. of Sci. — Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 UNCLASSIFIED

The nutritional needs of men subjected to climatic stress are reviewed. The writer takes exception to the hypothesis that the ascorbic acid requirement is increased in a cold climate and that consumption of large amounts of ascorbic acid will prevent cold injury, as he feels it is based on erroneous conclusions about the role of ascorbic acid in the production of cortical hormones and in the function of the human adrenal cortex. Data from field trials, pathological cases and laboratory experiments are cited in support, stressing the differences in the pituitary-adrenal system of the human and of the rat.

2992

Karmany, W. H.

[ORGANIZATION AND FUNCTIONS OF THE MEDICAL CORPS OF THE U.S. AIR FORCE] Ordinamento e funzioni del corpo sanitario dell'aeronautica

degli Stati Uniti. — Rivista di medicina aeronautica (Roma), 17 (1): 81-93. 1954. In Italian. DLC (TL555.A1R5, v. 17)

The organization of the Medical Corps of the U. S. Air Force is outlined and the activities of its various branches are described.

2993
Karstien, H. D.
[ACCOMMODATION AND CONVERGENCE FOLLOWING VESTIBULAR STIMULATION] Über das Verhalten von Akkommodation und Konvergenz nach Vestibularisreizung. — Albrecht von Graefes Archiv für Opthalmologie (Berlin), 155 (6): 574-587. 1954. In German. DNLM

An investigation was made of the effects of caloric and rotational stimulation of the vestibular apparatus on visual accommodation. In accordance with previous findings in regard to vestibular stimulation, three types of responses were observed: (1) the near point of accommodation (ANP) and the near point of convergence (KNP) moved closer; (2) ANP and KNP retreated into distance; and (3) no change was observed. These results are in agreement with previous investigations of effects of vestibular stimulation. In the same individual, changes in near points of accommodation and convergence were always synergistic though differing in extent. The change in accommodative capacity was larger in extent. No periodicity was observed in the sequence of changes. At times, the near point of accommodation changed only in one eye. Opposing reactions of the right and left eyes were never observed. The changes after rotational stimulation were usually larger in the preceding eye than in the following eye, and, after caloric stimulation, usually larger on the side of the cold syringe. These changes were most prominent immediately after the end of post-rotational nystagmus and subsided within 20 min. after the cessation of the stimulus. Changes in ANP and KNP by a repetition of vestibular stimulus could be evoked again only after an interval. The chief role in the development of nystagmus as a result of labyrinthine stimulation and outer recti muscle action is ascribed to the displacement of endolymph; however, other conditions seem to control the inner recti. In order to explain these differences the author points out the different localization in the innervation of the internal and external recti. (Author's summary, translated and modified)

2994
Kas'ianov, V. M., 1952
and A. L. Fruktov
[THE EFFECT OF SOUND SIGNAL INTENSITY ON THE RATE OF MAN'S MOTOR ACTIVITY] Vliianie sily zvukovogo signala na skorost' dvigatel'nykh aktov cheloveka. — Fiziologicheskiĭ zhurnal S.S.S.R. (Leningrad), 38 (6): 681-688. 1952. In Russian. DLC (QP1.F57, v. 38)

A series of experiments were performed to determine the response latency (time period between the beginning of a sound stimulus and the start of a person running) and running times for a 30-m. distance by varying the loudness of the starting bell. It was concluded that the physical intensity of the stimulus is an importnat factor in shortening or lengthening the response latency, as the latency of response may be shortened by a strong physical stimulus. Effector manifestations following the application of stimuli of different physical intensity are determined by the degree of cortical excitability. Increase of the excitability of the cerebral cortex by application of a standard set of physical exercises in the evening decreased considerably the latency and running time as compared to morning results.

2995
Katsh, S.,
G. F. Katsh, and P. Osher
ADRENAL, PITUITARY AND URINARY ASCORBIC ACID LEVELS IN RATS

SUBJECTED TO HYPOTHERMIC ENVIRONMENT. — Amer. Jour. Physiol., 178 (3): 457-461. Sept. 1954.
DLC (QP1.A5, v. 178)

Adult male albino rats were placed in metabolism cages and maintained at common laboratory temperatures or in the cold (2-4°C.). When the animals were killed in their respective environments 1, 3, 10, 12, or 28 days later, the adrenal and pituitary glands were weighed and analyzed for ascorbic acid. It was found that following the 1-day period both adrenal weight and ascorbic acid content were greater in the cold stressed rats. The amount of pituitary vitamin C was found to be significantly lower than control values at the 1-day interval, about normal at 10 days, and greatly elevated at the 28th day. Since the increased levels of ascorbic acid in the hypertrophied adrenals occur coincidentally with the higher plateau of adrenal-hypophyseal interaction induced by the stress, it is suggested that the pituitary-adrenal axis which is poised to maintain animals in a steady state is enabled to cope with the increased demands made upon it. The results of the analyses for urinary ascorbic acid show that the rats in the cold excreted about the same amount in a 24-hour period as did the controls. This may be considered as conservation of the vitamin by the stressed rats. (Authors' summary)

2996
Katz, M. S.,
A. Morris, and F. L. Dimmick
EFFECT OF VARIOUS DURATIONS OF RED ADAPTATION ON THE COURSE OF SUBSEQUENT DARK ADAPTATION. — Naval Medical Research Lab., New London, Conn. Report no. 246 (vol. 13, no. 7), April 27, 1954. ii + 9 p. (Project Report no. NM 003 041.58. 01). AD 36 614. PB 115349

The experimental data reported here pertain to the optimal duration of red light, the conditions under which it may be preferable to darkness, and the ensuing changes in dark adaptation. These data also represent a substantiation of earlier reported results. Thresholds were determined with 2° peripheral stimuli of 0.20 second duration through the course of dark adaptation. Experimental photopic-adaptation brightnesses were 16 footlamberts of red light for 10 minutes. Experiments yielded the following results: (1) Red adaptation results in a more rapid rate of early subsequent dark adaptation than does white light of the same brightness. (2) After 15 minutes of dark adaptation, a relatively stable level of sensitivity is reached which is only slightly affected by pre-adaptation conditions. After 30 minutes the thresholds give no evidence of differential effect. (3) No duration of red adaptation results in as low a threshold as a like duration of darkness. (From the authors' summary)

2997
[Kelvin & Hughes, Ltd. (Gt. Brit.)]
AIRCRAFT INSTRUMENTS AND THE CHANGING NEED. — Shell Aviation News (London), no. 187: 8-11. Jan. 1954. DLC (TL501.S55, no. 187)

Modern trends in aircraft instrument design are described, with particular regard to the technical implications. Some of the principal difficulties encountered in modern jet instrumentation are discussed, such as those imposed by the very small ratio of acting force and instrument movement (e.g. in altimeters), or by the need for accurate measurements of static pressures (speed indicators). The extent to which simplification of instrument panels can be achieved by judicious planning and design is exemplified in illustrations accompanying the text.

2998
Kemph, J. P.,
B. H. Burch, F. M. Beman, and F. A. Hitchcock
FURTHER OBSERVATIONS ON DOGS EXPLOSIVELY DECOMPRESSED TO AN AMBIENT PRESSURE OF 30 mm. Hg. — Jour. Aviation Med., 25 (2): 107-112. April 1954.
DLC (TL555.A1A4, v. 25)

Two groups of dogs were subjected to explosive decompression: from 520 to 30 mm. Hg, and from 180 to 30 mm. Hg. X-ray and fluoroscopic examinations were made while the dogs were being decompressed. Intratracheal, arterial, and venous pressures were determined. Most of the dogs survived exposures of 80 seconds or less at 30 mm. Hg atmospheric pressure; exposure times in excess of 90 seconds were not generally survived. Survival time increased, however, as the decompression range decreased. The following physical changes occurred during decompression: expansion of abdominal and thoracic gases resulted in thoracic and abdominal distention; evaporation of body fluids caused a secondary swelling in about 30 seconds following decompression. Collapse occurred in 10-20 seconds, respiration ceased in 30-60 seconds, and profuse salivation began 60-90 seconds after the onset of decompression. The arterial pressure dropped to 50-70 mm. Hg and pulse pressure disappeared within 15 seconds; there also occurred a rise in venous pressure to 35 mm. Hg within 1 minute after decompression.

2999
Kemph, J. P.,
and F. A. Hitchcock
FURTHER STUDIES OF EFFECTS OF HIGH INTRAPULMONIC PRESSURE ON DOGS AT 30 mm. Hg. — Jour. Aviation Med., 25 (3): 227-234. June 1954. DLC (TL555.A1A4, v. 25)

The cardiovascular effects of high intrapulmonic pressure at extremely low barometric pressure were studied in 10 dogs. Results indicate that dogs protected by counter-pressure from a fitted bladder suit can tolerate higher intrapulmonic pressure than when wrapped with a muslin binder. The cardiovascular system tolerates ambient pressures of 30 mm. Hg best when intermittent high (80-120 mm. Hg) intrapulmonic pressure is applied. Increased intrathoracic pressures result from vapothorax. The intermittent high intrapulmonic pressures may be used as a method of cardiac massage. Microscopic examination of an animal sacrificed 16 months after explosive decompression to an ambient pressure of 30 mm. Hg for two hours with intermittent application of 80-100 mm. Hg intrapulmonic pressure, showed fibrotic nodules and plaques in the lungs, heart, spleen, and brain. At low barometric pressure, increased intra-abdominal expansion causes a counter-pressure which permits use of higher intrapulmonic pressures.

3000
Kenney, R. A.
THE EFFECT OF THE DRINKING PATTERN ON WATER ECONOMY IN HOT, HUMID ENVIRONMENTS. — Brit. Jour. Indus. Med. (London), 11 (1): 38-39. Jan. 1954. DNLM

Water balance studies were made of men exercising (step-climbing) for 90 min. in hot, humid environments (climatic chambers, 100° F. dry bulb and 93.5° F. wet bulb). Four drinking patterns were employed and values for the following functions were recorded: (1) water debt (the difference between the initial and final weights expressed in terms of milliliters of water); (2) the water turn-over (the water debt plus the volume of water taken during the experiment); (3) the volume of water excreted in the urine; and (4) the non-urinary loss of water, calculated from the water turn-over minus the urinary loss; and (5) the change in rectal temperature during the exposure. The results indicate that a considerable saving in water required by the subject can be effected if small volumes are taken at frequent intervals rather than large volumes taken less frequently. When water is taken in volumes greater than 100 ml./dose, a significant diuresis results, leading to a greater loss of body water during experimental exposure. Frequent small doses led to a saving of between 300 and 400 ml. of water during the 90-min. period. The author suggests that

this study may be of value in any situation where the drinking water supply is limited.

3001
Khalil, H. H.
EFFECT OF HYPOTHERMIA ON THE HYPOTHALMIC-PITUITARY RESPONSE TO STRESS. — Brit. Med. Jour. (London), no. 4890: 733-734. Sept. 25, 1954. DLC (R31.B93, 1954)

The present experiments were carried out to examine the effect of a marked lowering of the body temperature on the pituitary-adrenocortical response to stress stimuli. Sixty-eight male albino rats, adapted to 24° C. room temperature, were divided into five experimental groups and subjected to stresses from combinations of anesthesia, adrenalectomy and exposure to cold. Response of the animals to these stresses was judged by the degree of ascorbic acid depletion of one of their adrenal glands. Groups I, II and III showed a significant fall in ascorbic acid content of the second adrenal gland as a response to varied combinations of stresses of anesthesia, adrenalectomy, and chilling. The fall was rendered more severe in the group which was exposed to cold. When these stresses were imposed on already hypothermic animals (Group IV) they failed to show any depletion in the ascorbic acid content. Further experiments proved, that in rats adapted to hypothermia of approximately 20° C. (Group V) the adrenal cortex still showed some response to small doses of ACTH, injected intravenously. The inhibition of the pituitary-adrenocortical mechanism observed in Group IV cannot be attributed to a lack of sensitivity on the part of the adrenal cortex. The author concludes that, at this degree of hypothermia, the adenohypophysis does not release any appreciable amount of ACTH in response to applied stresses. The evidence of hypothalamic involvement in the pituitary-adrenocortical response to stress favors the view that, in hypothermia, an inhibition of neural transmission of stress is mainly responsible for this block.

3002
Kidera, G. J.,
C. E. Murphy, and J. N. Waggoner
EVALUATION OF CORONARY ARTERY DISEASE WITH SPECIAL REFERENCE TO THE FLICKER FUSION TEST. — Jour. Aviation Med., 25 (6): 587-593. Dec. 1954.
DLC (TL555.A1A4, v. 25)

This is a review of some of the standard cardiac tests for the determination of hypertensive disease; the authors also describe the flicker fusion test, which produces a much higher percentage of correct diagnoses relative to coronary occlusion and predisposition to this disease. The electrocardiogram and other tests have been found to give only a fair percentage of correct interpretations in diagnosing the hypertensive diseases. The flicker photometer is used in the flicker fusion test. The instrument is set to flash at a frequency of 3,000 light flickers per minute. The patient is told to observe the light and to indicate when he can distinguish separate flashes, and the operator slowly decreases the frequency of the flicker until the frequency flicker threshold (FFT) is reached. Next a tablet of nitroglycerin is given to the subject, and the procedure is repeated; an increase or improvement in the FFT of over 60 indicates hypertensive disease, while a normal response is indicated by impairment or decrease of the FFT. An 80% correlation existed between the cases diagnosed as hypertensive using this test and actual coronary attacks.

3003
King, C. T. G.,
and K. E. Schaefer
ADRENAL PITUITARY RESPONSE TO 30 PER CENT CO_2 IN AIR AND IN OXYGEN [Abstract]. — Jour. Clin. Endocrinol. and Metabolism, 14 (7): 823. July 1954.
DLC (RC648.E45, v. 14)

Normal, adrenalectomized, and hypophysectomized rats of the Wistar-Hisaw strain (70 ± 10 days of age) were exposed to 30 per cent CO_2 in air and in oxygen for a period of one hour. Autopsy was performed one hour after exposure. White blood counts, differential, absolute eosinophil, absolute lymphocyte counts, and total blood sugar determinations were carried out before, during, and after exposure. Additional data were obtained from the adrenal cholesterol of guinea pigs submitted to the same experimental procedures. As a result of exposure to 30 per cent CO_2 in air, hypercapnia and anoxia developed, but 30 per cent CO_2 in O_2 produced only hypercapnia. Both experimental conditions produced in rats a significant leucocytosis (+50 per cent) and lymphocytosis, which were eliminated in hypophysectomized but not in adrenalectomized rats. The number of eosinophils in the normal rat under CO_2 in O_2 rose to 206-209 per cent; this effect was eliminated by adrenalectomy or hypophysectomy. An increased adrenocortical activity was indicated by a marked eosinopenia and lymphopenia in rats and guinea pigs one hour after exposure to CO_2 in air and in O_2, which was eliminated in the adrenalectomized rat under CO_2 in O_2. Additional evidence was found in the deceased adrenal cholesterol content in guinea pigs. (Quoted in full)

3004
King, C. T. G.,
E. E. Williams, J. L. Mego, and K. E. Schaefer
EFFECTS OF PROLONGED EXPOSURE TO CARBON DIOXIDE IN AIR ON PITUITARY-ADRENAL INTERRELATIONS IN THE MALE ALBINO RAT. — Naval Medical Research Lab., New London, Conn. Report no. 249 (vol. 13, no. 10), March 16, 1954. iii + 16 p. (Project no. NM 002 015.11.03). AD 36 750
UNCLASSIFIED

Normal and hypophysectomized rats were exposed to 1.5 per cent carbon dioxide for 42 days. Both groups of animals demonstrated a marked eosinopenia and lymphopenia, correlated with a drop in adrenal cholesterol and ascorbic acid. The blood sugar was maintained at a normal level, apparently, at the expense of liver and muscle glycogen stores. During this exposure to carbon dioxide, adrenal-cortical activity was increased and had not returned to initial levels when the animals were sacrificed at intervals during a ten-day recovery period on normal air. Results of the blood and adrenal studies indicate that prolonged exposure to 1.5 per cent carbon dioxide produces a stress on the pituitary-adrenal system which is not reversed during a 10-day recovery period. (Authors' abstract)

3005
King, C. T. G.,
E. E. Williams, and K. E. Schaefer
HYPERGLYCEMIC RESPONSE TO 30% CARBON DIOXIDE IN AIR AND IN OXYGEN. — Federation Proceedings, 13 (1^{I}): 79. 1954.
DLC (QH301.F37, v. 13)

Total blood sugar determinations were made from the tail vein blood of normal, adrenalectomized, and hypophysectomized rats of the Wistar-Hisaw strain (70 ± 10 days of age). These determinations were carried out before exposure; during exposure, at intervals of 10, 30 and 60 min.; and 1 hr. following exposure to 30% carbon dioxide in air and in oxygen. In the normal rats, the blood sugar increased 60% over the normal after 1 hr. exposure to 30% carbon dioxide in air; and a 30% increase after 1 hr. exposure to 30% carbon dioxide in oxygen was observed. The blood sugars returned to normal 1 hr. after exposure. Neither adrenalectomy nor hypophysectomy completely eliminated the hyperglycemic response to 30% carbon dioxide in air and in oxygen. As in the normal animal, the response was less under 30% carbon dioxide in oxygen. Statistical evaluation of the data will be presented. These results correlate

the findings of MacKay on plasma potassium during exposure of cats to 32%-38% carbon dioxide in oxygen. (From the authors' summary)

3006
Kingwill, A. N.
TRAINING THE MILITARY PILOT OF THE FUTURE. — Shell Aviation News (London), no. 189: 18-20. March 1954.
DLC (TL501.S55, no. 189)

The merits of all-jet pilot training are weighed against the presently applied methods of starting off the trainees on piston engine planes and transferring them, in the later stage of their training, to jets. While economic considerations point toward the all-jet training as the more advantageous, a final evaluation of the question can only come after having tested the latter method in practice for a certain length of time.

3007
Kinney, J. A. S.,
and C. H. Pratt
EFFECT OF REFRACTIVE ERROR ON ACUITY THROUGH BINOCULARS. — Naval Medical Research Lab., New London, Conn. Report no. 245 (vol. 13, no. 6), April 2, 1954. iii + 11 p. (Project Report no. NM 003 041.57.01). AD 36 615 UNCLASSIFIED

A study was made of visual acuity through binoculars, and of the extent to which refractive errors can be corrected by adjusting the eyepiece of standard 7 x 50 binoculars. The acuity of 5 observers with varying types of refractive error was measured by a liminal method using various dioptric settings in binoculars. The limens show that the highest acuities of all observers occurred at the dioptric setting approximating the spherical correction specified by the refractions. The acuities of 39 naval enlisted men were tested using their optimum binocular settings, and a comparison was made between the performance of men who did and did not have unaided acuity of 20/20. Individuals whose unaided acuity was poor because of simple spherical errors performed as well with binoculars as those whose unaided acuity was 20/20. Type of refractive error was shown to give a more adequate prediction of the individuals who perform well with binoculars than does the 20/20 standard. Astigmatism of less than 0.5 diopter did not impair acuity under any of the conditions tested, but larger amounts had a marked effect. (AD abstract)

3008
Kjørboe, F.
[CURRENT ACOUSTIC PROBLEMS IN THE AIR FORCE] Aktuelle akustiske problemer i flyvevåbnet. — Militaerlaegen (København), 60 (3): 82-89. Sept. 1954. In Danish.
DLC (RC970.D3, v. 60)

The problem of occupational hearing damage in the air force is considered from the standpoint of pilots and ground crews. A careful control over the degree of impairment in both groups through periodic hearing acuity checks is recommended to avoid legal complications. Also the use of ear defenders is advocated to reduce the degree of impairment.

3009
Kipp, F.
[HEARING DAMAGE FROM AIRCRAFT NOISE (PISTON ENGINE)] Gehörschädigungen durch Flugzeuglärm (Kolbenmotor). — Arbeitsphysiologie (Berlin), 15 (4): 324-343. 1954. In German. DNLM

After extensive frequency and loudness analyses of the noise produced by several types of piston-engine aircraft flying in formation, it was attempted to assess the effect of aircraft noise on the hearing thresholds of flight personnel, with due consideration to flight formation, airplane structure, and duration of flight. Hearing thresholds obtained from subjects under similar flight conditions showed hearing impairment of a pronounced

individual nature in regard to the extent and site of damage. Further investigation of flight personnel revealed that some degree of permanent hearing loss can be found usually after 2000 to 3000 flight hours. However, the extent of damage is still dependent upon constitutional predisposition. It is concluded that flying after several thousands of hours invariably results in hearing damage, encompassing frequencies used in speech. The degree of hearing loss is a function of constitutional factors and the ratio of hours in flight to rest intervals. Long-duration flights are found to be particularly damaging. Notwithstanding the constitutional predisposition involved, permanent hearing loss after flight service has to be regarded as an occupational disability and must be accorded the same compensation as other occupational diseases. A case history of permanent, extreme hearing loss as a result of long-duration flights during the war is related.

3010
Kirksey, M. H.
DENTAL RADIOLOGY DEPARTMENT. — Med. Technicians Bull., 5 (1): 13-14. Jan.-Feb. 1954.
DLC (RC970.U72, v. 5)

The objectives and functions of the Dental Radiology Department of the U.S. Air Force Dental Service are briefly outlined.

3011
Kisel'ova, A. F.,
and N. V. Lauer
[CHANGES IN THE HEART NERVE ELEMENTS IN CATS IN HYPOXIA] Zminy nervovykh elementiv sertsia̋ u kishok pri gipoksii. — Medychnyı zhurnal (Kiiv), 24 (5): 58-64. 1954. In Ukrainian. DLC (R91.M426, v. 24)

Cats were subjected to hypoxia to the point of death, and studies were made of the changes occurring in the heart nerve elements. The picture presents a pattern of regularity in which all the elements of the peripheral neurons are damaged: the gangliar cells, the medullated and non-medullated nerve fibers, the pericellular apparatus and the peripheral receptors are equally affected. The Dogiel multipolar cells of the first type become swollen, the staining properties of the neuron become altered, and "dyschromia" and partial decomposition of the intracellular structures make their appearance, as well as pyknosis and cellular gangliar destruction. The medullated and non-medullated nerve fibers at first acquire a high degree of reactivity, after which they undergo dystrophy and decomposition. The non-medullated conduction elements show signs of occasional outgrowth, hyperplasia and the formation of typical neurons. The pericellular apparatus becomes dystrophied. Dystrophic and destructive processes develop in the sensory nerve fibers and their endings; less frequently there are observed manifestations of growth reactivity of preterminal and terminal parts of the receptor apparatus. A most noteworthy occurrence in the hypoxia here dealt with is the high degree of sensitivity of the receptors (nerve ends).

3012
Kleitman, N. 1952
SLEEP. — Scient. American, 187 (5): 34-38. Nov. 1952. DLC (T1.S5, v. 187)

Studies on the physiological mechanisms of sleep and wakefulness show that the cerebral cortex is needed for wakefulness of choice and for adaptation of the sleep-wakefulness pattern to the diurnal cycle. Sustained wakefulness of any kind is impossible without the active participation of a subcortical center. The effects of experimental sleep deprivation (keeping individuals awake for 60-90 hours) are extreme muscular fatigue and lassitude which fluctuate during the daily cycle. It is also noted that the ability to remain awake runs parallel to fluctuations in body temperature, and is influenced by the individual's temperamental make-up. The author states that the mechanism

by which diurnal rhythm is established and maintained arises mainly from variations in muscular activity. The body muscles and cerebral cortex act as a mutual feedback circuit. As muscle tonus rises, so does body temperature, but sooner or later muscle fatigue stops this crescendo, the muscles begin to relax and the cycle turns downward bringing a diminuendo in cortical activity, alertness and body temperature, and sleep ensues.

3013

Kleitman, N., and E. Kleitman 1953

EFFECT OF NON-TWENTY-FOUR-HOUR ROUTINES OF LIVING ON ORAL TEMPERATURE AND HEART RATE. — Jour. Applied Physiol., 6 (5): 283-291. Nov. 1953. DLC (QP1.J72, v. 6)

Adherence to 18-hour and 28-hour sleep-meal-activity schedules, each for 3 weeks, under conditions of continuous daylight of the arctic summer, led to a disruption of the usual diurnal oral temperature rhythm in two young women, but not in a middle-aged man. By contrast, the heart rate observed in two subjects (including the temperature-fast one) promptly conformed to the two non-24-hour routines by acquiring distinct 18-hour and 28-hour periodicities. (Authors' summary)

3014

Kline, R. F., and H. C. Dyme 1952

EFFECT OF VITAMIN B COMPLEX ON THE RELATION OF FOOD TO SURVIVAL POTENTIAL AT HIGH TEMPERATURE OF ANIMALS RESTRICTED ISOCALORICALLY. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Note WCRD no. 52-119, Dec. 1952. 9 p. (RDO no. 696-81). AD 5951

UNCLASSIFIED

A study was made of vitamin B supplementation of rats kept at 90° F. with daily diets restricted to glucose, olive oil, vitamin-free casein, Purina laboratory chow, or no food. Each animal except the starving controls, received 8 Cal./day and all had an unlimited water supply. The effects of vitamin B included: (1) a significant increase in the water intake of rats subsisting on olive oil and glucose; (2) a significant weight reduction in rats subsisting on glucose, olive oil, and no food; (3) an increase in the survival time of all the groups; and (4) a significant decrease in the efficiency of utilization of rats on Purina chow and casein. The evidence indicated that vitamin B would not alter the relative superiority of carbohydrates in rats subsisting on 8 Cal./day when water was curtailed. Survival would be prolonged and weight would be reduced, thereby equalizing the effect on body tissue conservation. (AD abstract)

3015

Kline, R. F., and H. C. Dyme 1953

EFFECT OF CURTAILED WATER INTAKE ON THE RELATION OF FOOD TO SURVIVAL POTENTIAL AT HIGH TEMPERATURE OF ANIMALS RESTRICTED ISOCALORICALLY. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Note WCRD 53-150, Dec. 1953. 7 p. (RDO no. 696-81). AD 27 688

UNCLASSIFIED

Water curtailment at high temperature decreases survival potential of underfed animals. At high temperature when water is restricted in underfed animals: (1) those on protein have the lowest survival potential; (2) those on carbohydrate lose less weight and live longer than those on protein and Purina Laboratory Chow; (3) those on fat live longest. Water restriction at high temperature diminishes the survival advantage of feeding. This decrease is great enough in the case of protein, to make such feeding actually harmful. (Authors' conclusions)

3016
Kline, R. F.,
and H. C. Dyme
EFFECT OF WATER CURTAILMENT UNDER TEMPERATURE CONDITIONS ON THE RELATION OF FOOD TO SURVIVAL POTENTIAL OF ANIMALS RESTRICTED ISOCALORICALLY. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Note WCRD no. 54-11, Jan. 1954. 8 p. (RDO no. 696-81). AD 29 592
UNCLASSIFIED

Each of five groups of male rats was fed one of the following: fixed portions of dextrose, olive oil, vitamin-free casein, Purina Laboratory Chow, and pemmican. In five of the groups, each animal, individually caged, received 8 Cal./day, a fuel level comparable to that furnished by the individual portion of the standard AF restricted survival ration. A sixth group received no food (negative control). Twenty animals in each group had free access to water; the remaining 18 were restricted to 5 cc./rat/day. Animals were weighed daily; they were maintained on their regimens until death. Curtailing the water intake of underfed animals increased weight loss from 7.88 to 15.2% for animals underfed on Purina Laboratory Chow; from 9.43 to 16.1% for carbohydrate (dextrose)-underfed animals; from 10.39 to 16.0% for protein-underfed rats; from 11.9 to 16.1% for those underfed on fat (olive oil); and from 14.5 to 17.6% for those that received no food. Water curtailment did not affect weight loss appreciably in the group on pemmican (dehydrated meat bar). Limiting the water supply to 5 cc./rat/day reduced average survival from 13.0 to 7.9 days for those subsisting on balanced type ration; from 12.3 to 7.4 days for those on carbohydrate; from 11.0 to 6.2 days for those fed protein; and from 6.9 to 4.7 days for the starving controls. In animals on fat and those on pemmican the reduction in survival was slight; from 11.0 to 10.4 days for the fat, and 17.1 to 16.8 days for the pemmican. (AD abstract)

3017
Knoepfel, H. K. 1953
[HIGH PERFORMANCE FLIGHT AND AVIATION MEDICINE] Hochleistungsflug und Fliegermedizin. — Flugwehr und Technik (Frauenfeld), 15 (3): 60-62; (6): 127-130; (8): 175-178; (9): 202-205. March, June, Aug.-Sept. 1953. In German. DLC (TL503.F625, v. 15)

A review is presented of the physiological problems of high altitude flight and effects of acceleration.

3018
Knoepfel, H. K.
[INDIVIDUAL PSYCHOLOGICAL SELECTION OF SWISS MILITARY PILOTS] La sélection psychologique individuelle des pilotes militaires suisses. — Médecine aéronautique (Paris), 9 (4): 381-395. 1954. In French. DLC (TL555.M394, v. 9)

Selection criteria for military pilots in Switzerland are as follows: (1) military performance; (2) psychiatric test scores; and (3) pilot aptitude. The intelligence level and educational background of the applicant is expected to surpass that of the average population. Cases of neurosis, either presently manifest or in the applicants' history, are automatically excluded. A desire to fly is recognized if based on sound motivation and if the applicant shows a live interest and purposefulness. Military performance scores at the second-lieutenant level are absolute prerequisites. Two thirds of the candidates having passed the psychiatric aptitude test, have also been successful in the flight test. Over three quarters of the candidates having not met with the above requirements failed the pilot selection test. (Translated author's abstract, modified)

3019
Koch, C. 1953
[CONDUCTION AND PERCEPTION DEAFNESS IN FLIGHT PERSONNEL: AUDIOMETRIC RESEARCH BY THE T. SUZUKI AND T. HIROSE METHOD] Sordità di conduzione e di percezione

negli aeronaviganti. Ricerche audiometriche con il metodo di T. Suzuki e T. Hirose. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 167-190. In Italian, with English summary (p. 188-189).
DNLM (W3.C0943a)

A discussion is presented on aerotitis media, sound injury, or a combination of both, which may cause conduction or perception deafness in flight personnel. Several audiometric methods used in the differential diagnosis of conduction and perception deafness are described with special emphasis given to the test of Suzuki and Hirose (testing hearing acuity prior to and after the instillation of 8 drops of glycerin into the external auditory canal). This practical and reliable method is of value in aviation medicine for the prevention and early detection of hearing disorders in personnel.

3020
Köhler, U. 1952
[A 24-HOUR RHYTHM OF THE HEART AND SPLEEN GLYCOGEN IN THE WHITE RAT] Ein 24-Std.-Rhythmus des Herz- und Milzglykogens der weissen Ratte. — Naturwissenschaften (Berlin), 39 (18): 433-434. Sept. 1952. In German. DLC (Q3.N7, v. 39)

An analysis of the fluctuations in glycogen content of the cardiac muscle and the spleen of fasting albino rats showed a definite 24-hour rhythm, whereby the maximum peak was reached shortly after midnight and the minimum shortly before noon. Additional maximal peaks of glycogen content occurred at approximately 4:00 p.m. in the heart. The diurnal rhythm in the glycogen content of these organs parallels that of liver glycogen. The close associations of the diurnal rhythms of glycogen content in these organs independently of the nutritional status of the animal is indicative of a close functional relationship of heart, spleen, and liver

3021
Kolchins'ka, A. Z. 1953
[THE EFFECT OF OXYGEN INSUFFICIENCY ON THE HIGHER NERVOUS ACTIVITY OF MAN] Pro vpliv nestachi kysniû na vishchu nervovu diîal'nist' liudyny. — Medychnyi zhurnal (Kiiv), 23 (2): 4-9. 1953. In Ukrainian.
DLC (R91.M426, v. 23)

Rarifying the air in a pressure chamber to the equivalent of an altitude of 5000-6000 meters or ascending Mount El'brus to a height of 4250 meters produces marked changes in the higher nervous activity: the magnitude of conditioned reflexes is reduced, the latent period of response increases, the conditioned reflex is inhibited easier by external agents, differentiation is arrested or delayed, conditioned inhibitions are disturbed, and phase and paradoxical reactions make their appearance. The above disturbances caused by reduction in barometric pressure are more pronounced at high mountain altitudes than in the pressure chamber. At actual mountain altitudes of 4250 meters conditioned reflexes, and especially differentiation reflexes, develop with greater difficulty in non-acclimatized than in acclimatized individuals. As acclimatization proceeds, disturbances in the higher nervous activity begin to disappear.

3022
Koller, F.,
E. Schwarz, and M. Marti
[THE REACTION OF THE ADRENAL CORTEX DURING ASCENT TO HIGH MOUNTAINS] Ueber die Reaktion der Nebennierenrinde beim Aufstieg ins Hochgebirge. — Acta endocrinologica (Copenhagen), 16 (2): 118-140. June 1954. In German, with English summary. DNLM

Two experimental series dealing with ascent to various altitudes were undertaken to determine the extent of the effect of altitude on the adrenal cortex. In the first series, 8 subjects ascended by rail from Lauterbrunnen to

the Jungfraujoch (3450 m.). The following changes were registered: an increase in thrombocyte and total leukocyte counts, a decrease of eosinophils and anti-thrombin, and an increased excretion of 17-ketosteroids and of reducing corticoids. In the second series carried out to test the effects of small differences in altitude, the same reactions were noted during ascent by rail from Zürich (450 m.) to Davos (1600 m.). It is concluded that "passive" ascent to high altitudes is accompanied by an increased secretion of adrenocortical hormones. The alterations described may be explained as a non-specific stress reaction, the origin of which is not yet clearly understood. Experiments in a decompression chamber showed that a simulated altitude of 3500 m. was insufficient to evoke changes similar to those observed during ascent to the Jungfraujoch; however, a further simulated climb to 5000 m. showed recognizable tendency to similar changes, although less pronounced. For this reason, it was concluded that a decrease of partial oxygen pressure is not alone responsible for the results obtained. Clinically this reaction becomes important in cases of bronchial asthma, as the identical effect is obtained from passive ascent to high altitudes as from an ACTH injection. (Authors' summary, modified)

3023
Kondratovych, M. A.
[THE INTERRELATION BETWEEN THE RESPIRATORY AND VASOMOTOR CENTERS] Pro vzaemovidnoshennia dykhal'nogo i sudynorukhovogo tsentriv. — Medychnyi zhurnal (Kiiv), 24 (6): 3-7. 1954. In Ukrainian.
DLC (R91.M426, v. 24)

No single or predominant point of view exists on the subject indicated by the title. Therefore, it was thought desirable to secure additional experimental data on this point. The results of the present study confirm the point of view held by D. A. Birĭukov according to which simultaneous reactions emanating from blood pressure and respiration can be of the following three types: (1) control of the vasomotor center by the respiratory center, (2) control of the respiratory center by the vasomotor center, (3) independent functioning of each.

3024
Konecci, E. B ,
and W. F. Taylor
BIOLOGICAL AND MEDICAL ASPECTS OF IONIZING RADIATION: EFFECTS OF WHOLE-BODY X-RADIATION IN GUINEA PIGS WHILE UNDER VARIOUS SIMULATED FLYING CONDITIONS. — School of Aviation Medicine, Randolph Field, Tex. April 1954. 12 p. (Project no. 21-3501-0005, Report no. 11) AD 31 131 PB 114197
Also published as: EFFECTS OF WHOLE BODY X-RADIATION ON THE SURVIVAL TIME OF GUINEA PIGS WHILE UNDER VARIOUS SIMULATED FLYING CONDITIONS. — Jour. Aviation Med., 25 (5): 530-540, 552. Oct. 1954. DLC (TL555.A1A4, v. 25)

A study was made of the combined effects of ionizing radiation and various simulated flying conditions. A total of 250 male guinea pigs received total-body exposures at a rate of 145 r/minute of X-radiation. A dose of 1600 r was used in the majority of the experiments, while the other doses ranged from 500 r to 8000 r. At the 500-r level of 60% of the hypoxic animals survived the 30-day test period as compared to 20% survival in the controls. At the 1600-r level, the mild hypoxia group survived significantly longer than the ground-level control group and the severe hypoxia group much longer than control and mild hypoxia groups. No significant increase in radiosensitivity resulted from breathing 100% oxygen. Cold alone slightly increased survival time, but cold at altitude with 100% oxygen did not show this protection. Cold plus severe hypoxia markedly increased survival time. Non-digestible diet (asbestos fiber) and long flight both significantly increased survival time. Results indicated that the general conditions met while flying were not detrimental to

the guinea pig in combination with exposure to ionizing radiation. (From AD abstract)

3025
Koolstra, J.,
and C. D. de Langen
[THE SIGNIFICANCE OF THE "COLD PRESSOR TEST" IN EXAMINATIONS] De betekenis van de "Cold Pressor Test" bij keuringen. — Aeromedica acta (Soesterberg, Netherlands), 3: 115-126. 1954. In Dutch. DNLM

The cold-pressor test developed by Hines and Brown (response of blood pressure to immersion of one hand in ice water) is used as part of the physical examination of pilot candidates in the Netherlands to exclude probable and future hypertensives. Attempts were made to standardize and simplify the test procedures to evaluate the reliability of the test and to determine factors that may affect it. As an alternate method, it is suggested that a certain area of one arm be sprayed with chlorethylene until a thin layer of ice forms over the skin surface. Blood pressure values obtained by this simpler method are in agreement with those obtained by the older method. Upon testing a large number of aviation candidates, it was concluded that the cold pressor test produces definite changes in blood pressure. However, in trying to determine hypertensives and hyperreactors, no definite threshold value could be established. The chief value of the cold pressor test lies in the fact that prehypertensive states may be ruled out whenever the cold pressor reaction is manifested as a distinctive lowering of blood pressure. The environmental temperature exerts a masking influence on the cold pressor reaction, so that in a cold room there is none or a very slight reaction. In warm places the reaction is intensified. The type of cold pressor reaction observed, i.e., a fall or rise in blood pressure, depends upon the relative lability of the circulatory system. The initial rest values were found to be highly influenced by the emotional and physical state of the candidates.

3026
Korchin, S. J.,
and H. Basowitz
THE TACHISTOSCOPIC BENDER-GESTALT TEST [Abstract]. — Amer. Psychologist, 9 (8): 408. Aug. 1954. DLC (BF1.A55, v. 9)

Ordinarily, the stimuli of the Bender-Gestalt test are in full view of the subject during the period of reproduction. In the present studies, the stimuli are presented tachistoscopically at three exposure levels, to avoid the disturbances resulting from induced or clinical anxiety, if the Bender-Gestalt stimuli are perceived visually. The procedure was administered to 20 persons, 55 to 65 years of age, and to 14 subjects between 25 and 35 in the course of a study of aging, and to 86 army men, as part of a study of reactions to stress in paratrooper training. It was found that the younger subjects scored distinctly better than the older sample. Within the older sample there was significant relationship between performance at the fastest exposure level and overall adjustment, as measured by the Fisher Maladjustment Index of the Rorschach test. This relationship decreased at the longer exposure levels. Results of the study of army men indicate that performance on the Bender is related to adequacy of functioning under stress, as measured by various psychological, physiological, and performance indices. In general, the Bender-Gestalt test, administered tachistoscopically, seems to be a promising technique in psychodiagnosis. (Abstract, modified)

3027
Korner, P. I.
THE CARDIAC OUTPUT IN ACUTE ANOXIA IN UNANAESTHETIZED RABBITS. — Australian Jour. Exper. Biol. and Med. Sci. (Adelaide), 32 (4): 511-522. Aug. 1954. DLC (QH301.A8, v. 32)

The cardiac output was depressed approximately 30% in unanesthetized rabbits when exposed to 15%-11.5% O_2 in nitrogen for periods from one to four hours. Breathing 18% O_2 had only a slight and transient effect on the cardiac output. None of the hypoxic mixtures produced a significant change in heart rate or mean arterial pressure. There was a suggestion of some rise in right atrial pressure with 15% and 11.5% O_2. There was a depression of oxygen consumption in the rabbits on exposure to the hypoxic mixtures. Evidence was presented that anoxia disturbs the normal heat regulating mechanism of unanesthetized rabbits. The depression of the cardiac output was thought to be due to a direct effect of anoxia on the myocardium; it was rapidly reversible in 5 of 6 animals tested on returning to 21% O_2. The significant rise in O_2 consumption observed for the first hour following anoxia was suggestive of repayment of an oxygen debt. A comparison of the fall in cardiac output in rabbits with rise in cardiac output in response to anoxia reported for other species indicates a species difference dependent on the rate of adaptation or acclimatization to anoxia. Acclimatization to anoxia seems to be developed most effectively in man. (Author's summary, modified)

3028
Korner, P. I.,
and F. C. Courtice
THE EFFECTS OF ACUTE ANOXIA AND NORADRENALINE VASOCONSTRICTION ON LYMPH FLOW AND PROTEIN DYNAMICS FOLLOWING TRANSFUSIONS OF RINGER-LOCKE SOLUTION. — Australian Jour. Exper. Biol. and Med. Sci. (Adelaide), 32 (3): 321-332. June 1954.
DLC (QH301.A8, v. 32)

In the present experiment the effects of anoxia on capillary permeability to protein were studied by investigating changes in the thoracic duct lymph flow and protein composition during intravenous infusions of Ringer-Locke solution in three groups of cats. The first group was transfused while breathing air; the second while breathing an anoxic mixture of 10% O_2 in nitrogen; and the third group was transfused while receiving noradrenalin at the rate of 0.3 μg./kg. per min. The anoxic and noradrenalin groups showed evidence of systemic vasconstriction. The systemic and portal venous pressures were elevated in this group, and this was thought to be a compensating mechanism to enable normal fluid filtration to take place through a reduced vascular bed. There was no significant difference in the loss of total protein and T1824-labelled protein in the plasma in any of the groups. The amount of T1824 recovered in lymph was not significantly different in any of the groups. The thoracic duct protein concentration was affected by different factors in each group. The equilibrium between specific activities of plasma and lymph was attained much more rapidly even with low net infusions in the anoxia and noradrenalin groups than in the air group. Evidence was presented that this was due to a reduction of the effective size of the extra-vascular fluid and protein pool, and that this phenomenon accompanied systemic vasoconstriction. (Authors' summary, modified)

3029
Kramár, J. 1953
STRESS AND CAPILLARY RESISTANCE (CAPILLARY FRAGILITY). — Amer. Jour. Physiol., 175 (1): 69-74. Oct. 1953. DLC (QP1.A5, v. 175)

Forced muscular exercise or exposure to cold stress elicits a typical response in the capillary resistance of of the albino rat. Emotional stress may also be followed by a similar change in capillary resistance. While, in general, capillary response is rather uniform there are variations in the time element and quantitative aspect. In addition, an attempt was made to elucidate the mechanism and significance of the capillary response to stress. While the initial rise in the capillary resistance is likely to be due to an increased

elaboration of cortisone elicited by ACTH discharge, the capillary crisis appears to be the result of a decrease in the adrenocortical activity not related primarily to the anterior pituitary. (From the author's summary)

3030
Kramár, J.,
C. M. Wilhelmj, V. W. Meyers, D. P. Milani, D. E. Gunderson, D. Shuput, E. M. Racher, and P. S. Mahoney
STRESS OF FASTING AND REALIMENTATION AS REFLECTED IN THE CAPILLARY RESISTANCE AND EOSINOPHILE COUNT. — Amer. Jour. Physiol., 178 (3): 486-492. Sept. 1954.
DLC (QP1.A5, v. 178)

The effect of prolonged fasting and realimentation on the capillary resistance and circulating eosinophils of dogs and rats was studied. When dogs were subjected to a prolonged fast there was a progressive rise in capillary resistance and a fall in circulating eosinophils. Realimentation of fasted dogs with luxus consumption diets high in carbohydrate tended to maintain the fasting levels of capillary resistance and eosinophils. Realimentation of fasted dogs with luxus consumption diets high in protein, either initially or subsequent to a diet high in carbohydrate, caused a rapid return of capillary resistance to control level. The rise of the eosinophils was slower, often with marked initial overshooting. In the albino rat, capillary resistance increased during the fasting period, dropped to pathologically low levels upon realimentation, remained there for various lengths of time and, finally, returned to normal. The number of eosinophils changed inversely with the capillary resistance. These changes are similar to those found previously following various other forms of stress in the rat. In contrast to the dog, the realimenting diet (high in protein or in carbohydrate) did not influence the described capillary response in the rat. (Authors' summary)

3031
Krauskopf, J.,
R. A. Duryea, and M. E. Bitterman
THRESHOLD FOR VISUAL FORM: FURTHER EXPERIMENTS. — Amer. Jour. Psychol. 67 (3): 427-440. Sept. 1954.
DLC (BF1.A5, v. 67)

Foveal form thresholds were measured in terms of the intensity of illumination required to identify luminous figures briefly exposed in a dark room. The form threshold varies inversely with the exposure time, with the magnitude of critical detail, and, to some extent, with the area. The reciprocity of time and intensity is qualitative as well as quantitative; with short exposure times distortions of form appear which are comparable to those obtained at low intensities of illumination. The brightness threshold, like the form threshold, varies inversely with the exposure time and with the area, but it is unaffected by extensive differences in configuration. Evidence is presented to show that the observer's knowledge of the forms employed may mask real differences in the form threshold. (Authors' summary)

3032
Krebs, A. T.
TECHNIQUES OF BIOLOGICAL MEASUREMENTS OF LOW LEVEL RADIATION. — Jour. Aviation Med., 25 (4): 331-337, 353. Aug. 1954.
DLC (TL555.A1A4, v. 25)

A brief survey is presented of the literature on the present techniques for the biological measurement of low-level radiation in the light of their possible application to high-altitude studies. These techniques concern: (1) changes in blood counts and in the formed elements of the blood, (2) histological changes, (3) changes in growth, weight, and life span. The author states that, up to now, techniques for biological measurements of low-level radiation are based on radiation damage and injury; he proposes taking the "stimulating effects" as measures of the

biological effects. They occur relatively early and may be used as a warning signal and a monitoring agent in cosmic ray exposure.

3033
Kreinin, S. 1953
WHICH PATIENTS MAY FLY. — GP, 8 (2): 45-48. Aug. 1953.
DLC (R11.G15, v. 8)

Flying is not harmful to the vast majority of sick people. This form of travel may be contraindicated in patients having severe anemia, serious pulmonary disease, pneumothorax, cardiac decompensation, or severe coronary insufficiency. Stricture of the Eustachian tube predisposes to the development of ear trouble during flight, and upper respiratory infections may lead to otitis media or purulent sinusitis. (Author's abstract)

3034
Krendel, E. S.,
and G. H. Barnes
INTERIM REPORT ON HUMAN FREQUENCY RESPONSE STUDIES. — Franklin Institute, Philadelphia, Pa. (Contract AF 33(038)-10420); issued by Wright Air Development Center. Aircraft Lab. and Aeromedical Lab., Wright-Patterson Air Force Base Ohio. WADC Technical Report no. 54-370, June 1954. xi + 67 p. (E. O. no. 694-39). AD 47 529 PB 117121

Linearized open loop human transfer functions or "descriptive functions" have been measured using random forcing function inputs to pilots flying on an F-80A simulator. Three input bandwidths, 1, 2, and 4 radians per second and three amplitudes of 0.3, 0.6, and 1.2 r.m.s. inches were used on the display oscilloscope. Four jet pilots served as subjects. The results are phase and amplitude characteristics of the pilots for aileron and elevator control in response to visual signals displayed on a cathode ray oscilloscope. Within the limits of the experiments performed it appears that changes in open loop "human transfer functions" because of day to day variations and different pilots are not significant. Phase characteristics were only weakly dependent on forcing function amplitude and bandwidth. The pilot's "transfer functions" for aileron and elevator control were clearly different. (Authors' abstract)

3035
Krijger, M. W. W.
[THE SIGNIFICANCE OF THE LABYRINTH IN AVIATION] De betekenis van het evenwichtsorgaan voor de vlieger. — (Thesis, Univ. of Utrecht), 1954. 101 p. In Dutch, with English conclusions (p. 96-97)
DLC (RC1075.K75)

Good orientation, regulation, and coordination are necessary for the maintenance of equilibrium. Orientation refers to the sensory observations themselves, while regulation and coordination refer more to the central nervous system and the sensory reactions. In normal flight, a sensitive organ of equilibrium is a biological mechanism enabling fine regulation. A too sensitive organ of equilibrium predisposes to illusions, vertigo and air sickness. For aerobatics, normally sensitive organs of equilibrium, with the power of central inhibition, are desirable. It is a necessity that the pilot's organs of equilibrium with their central connections and coordination be completely in balance. Small differences can be demonstrated by the cupulogram of sensation and nystagmus. If the candidate-pilot's cupulogram differs from the type accepted as normal, he must remain under the continuous supervision of the medical officer and the instructor. After cranial trauma with persisting symptoms of dizziness, the cupulogram is the decisive factor as to whether the pilot is still fit to fly, as far as the dizziness is concerned. The interpretation of this cupulogram is facilitated when a cupulogram has already been made previously under normal circumstances. The absence of per-rotatory

sensations and reactions during aerobatics can be explained by the masking action of the simultaneous strong otolith stimulation, becoming manifest in sensations of rising or falling, and by the cerebral anemia caused by the centrifugal acceleration. (Author's conclusions)

3036

Krimsky, E.

AN APPRAISAL OF AVIATION EYE TESTS WITH RECOMMENDATIONS. — Jour. Aviation Med., 25 (5): 543-552. Oct. 1954. DLC (TL555.A1A4, v. 25)

Orthophoria and heterophoria are described; the Maddox Rod Test and the basic Cover Test are compared, and the author expresses the opinion that the Cover Test is more accurate. He states that the test for the convergence near point has been unduly emphasized with respect to its importance, for he as been able to improve the convergence near point reserve in patients who had been considered incapable of improvement. This has been done by using a source of light as a stimulus for the convergence rather than an unlighted object. The prism reflex method of testing for the true position of the eyes utilizing the corneal light reflex as a determinant is discussed; the author feels that this is an excellent test for determining orthorphoria and the several possible deviations from the fundamentally straight position of the eyes; this reflex is extremely accurate in determining diplopia. The red-lens test for diplopia is mentioned. The author recommends more flexible rules to govern the distances at which the subject may be tested. Generally, the author feels that any eye examination which does not allow direct observation of the eyes is unreliable; for this reason, he states that use of the darkroom and the phorometer give inaccurate information.

3037

Krop, S.

THE TOXICITY AND HEALTH HAZARDS OF ROCKET PROPELLANTS. — Jet Propulsion, 24 (4): 223-227, 236. July-Aug. 1954.
DLC (TL780.A613, v. 24)

A number of rocket fuels and oxidizers and their decomposition products are poisonous, and conditions attending their use may present hazards to personnel. Thus it becomes important for persons concerned with these materials to be educated in the nature of these hazards, how to prevent injury, and how to administer first aid if exposure occurs. Fuels (ammonia, aniline, alcohols (ethyl, furfuryl, methyl), hydrazine, and JP-4) and oxidizers (hydrogen peroxide, liquid oxygen, and red fuming nitric acid) are discussed in detail and the following topics considered for each: (1) composition and appearance, (2) method of entry into the body, (3) extent of toxicity, (4) symptoms, and (5) protective measures and treatment. (Author's summary, modified)

3038

Kudrin, A N.

[EFFECT OF NARCOTICALLY INDUCED INHIBITION OF THE CENTRAL NERVOUS SYSTEM UPON THE REACTIONS OF THE VOMITING CENTER] Vliianie tormozheniia tsentral'noĭ nervoĭ sistemy vyzvannogo narkoticheskimi veshchestvami na reaktsii rvotnogo tsentra. — Farmakologiia i toksikologiia (Moskva), 17 (10): 12. Jan.-Feb. 1954. In Russian.
DLC (RS1.F25, v. 17)

Two dogs were used in this study. The results are summarized as follows: Identical state of light sleep induced by chloral hydrate, barbamile, and morphine produced different protective effects against vomiting spells produced by apomorphine and $CuSO_4$. Morphine narcosis produced best results; this was followed by the effects of barbamile with chloral hydrate narcosis giving the least protection. Combined narcosis of morphine, barbamile, and chloral hydrate exhibited a moderate sleep-inducing effect with considerable potentiality as antivomiting protection in relation to the humorally acting apomorphine and reflex

stimulating effect of $CuSO_4$. Combined morphine, barbamile, and chlorhydrate gave highest protective antivomiting results; the effects of morphine and barbamile or of morphine and chlorhydrate were considerable, and the effect of barbamile and chlorhydrate was moderate.

3039
Kylstra, J.
[REGISTRATION OF ACCELERATIONS BY MEANS OF THE SO-CALLED U. EFFECT] Registratie van versnellingen met behulp van het zgn. U. effect. — Aeromedica acta (Soesterberg, Netherlands), 3: 271-275. 1954. In Dutch with English summary (p. 275). DNLM

A description is given of a simple method of registering small linear and rotatory accelerations. Its use in ballistographic tests and its technical applications are discussed. Analogies with the mechanism of the vestibular apparatus are shown.

3040
Lacey, R. J.
SUITABILITY OF THE GRAY INSTRUMENT PANEL FOR USE IN USAF AIRCRAFT. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WCRD Technical Note no. 54-12, April 23, 1954. 17 p. (RDO no. 694-41). AD 35 938 PB 114944

A study was made to determine the functional suitability and pilot acceptance of a dark gray instrument panel instead of a black panel. Questionnaires were submitted to 38 pilots at the completion of flights in B-25 and T-33 aircraft equipped with gray panels. The data indicated that the gray instrument panel was functionally suitable for USAF aircraft and highly acceptable to the AF pilots. The color recommended was dark gray, color no. 3520, Specification TT-C-595. (AD abstract)

3041
Lacoste, J.
[THEORETICAL STUDY OF ALVEOLAR GAS VARIATIONS RELATED TO VENTILATION AND DIFFUSION DURING THE RESPIRATORY CYCLE] Étude théorique des variations du gaz alvéolaire, liées à la ventilation et à la diffusion au cours du cycle respiratoire.— Journal de physiologie (Paris), 46 (1): 398-401. 1954. In French. DNLM

Equations for the circulation of theoretical alveolar ventilation volume and dead space values during respiration are proposed. The volume of air inspired and the mean O_2 level in the total expired volume are measured using Benedict type spirometry with CO_2 absorption. Comparison of the values obtained at rest and under effort show the value of the functional respiratory reserve and the relative importance of diffusion and ventilation in this reserve.

3042
LaCroix, R. E.
JET ENGINE CONTROLS: A PILOT'S EYE-VIEW. — Aviation Age, 21 (2): 94-103. Feb. 1954.
DLC (TL501.A8187, v. 21)

The theoretical control system (evolving from a recognition of the problems of emergency and fuel system failures in afterburning engines) consists of a simple, basic control system capable of safely operating the engine throughout the full range of the throttle lever travel and trimmed to obtain maximum performance. Engine r.p.m. is controlled by governing fuel flow, and engine temperature is controlled through the exhaust nozzle area. The two systems are interlocked by linkage to the common pilot throttle lever so that no consideration is required on the pilot's part other than controlling his acceleration rate during emergency operation. The system is designed to incorporate a maximum of reliability and fail-safe features. It is so arranged that in case of electrical or other failure, the pilot can continue takeoff and fly for an indefinite period of time without endangering the aircraft.

3043
Lakshaminarayan, H.
PSYCHOLOGICAL STRESSES AND REACTIONS TO FLYING. — Aero Med. Soc. Jour. (New Delhi), 1 (2): 28-36. Oct. 1954. DNLM

Psychological stresses encountered while serving in the Air Force can be classified broadly into four categories: (1) stresses common to all individuals, (2) stresses peculiar to military life, (3) flying stresses, and (4) operational stresses (under situations of danger, etc.). These stresses may act cumulatively upon the pilot until he succumbs to operational fatigue expressed in psychoneurotic and psychosomatic reactions to flying. The psychological mechanism in operational fatigue is one of identification (e.g., with an associate, who was killed in an aircraft accident) and/or displacement, i.e. transference of anxiety developed in another life situation to the current flight situation in form of a phobic reaction or in form of various psychosomatic symptoms. Prodromal symptoms of operational fatigue are: insomnia, nightmares, physical fatigue, startle reactions, inability to concentrate, and personality changes. Overt symptoms are overwhelming exhaustion, which cannot be relieved by rest, or anxiety reactions sometimes masked as reactive depressions. Studies of flying accidents in England due to pilot error have revealed anticipatory tension to be one of the chief causes resulting in impaired efficiency. The first and main responsibility of the medical officer is early diagnosis of operational fatigue; often the symptoms may be so concealed and minor that the need for medical attention is not recognized. Reassurance by the medical officer in early cases, or grounding the pilot for a few days for medical reasons may help the individual to muster enough confidence to overcome these stresses. Vigilance on the part of the medical officer can help prevent psychiatric casualties.

3044
Lalli, G., 1953
and L. Lipari
[CAUSES OF DISABILITY IN MILITARY AIR FORCE PERSONNEL FROM 1946 TO 1952 BASED ON THE PROVISIONS FORMULATED BY THE AIR FORCE MEDICO-LEGAL INSTITUTES: STATISTICAL REPORT] Cause di inabilità nel personale militare del'A. M. dal 1946 al 1952 sulla scorta dei provvedimenti formulati dagli istituti medico-legali dall'A. M. Lavoro statistico. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Communicazioni, p. 191-266. DLC (W3.C0943a)

A statistical study is presented evaluating temporary and permanent disability, as defined by the Medico-Legal Institutes (1946-1952), for military and aviation services. Included is a classification of diseases, classification of personnel (pilots, specialists with continuous flight duty, and other categories), and a classification of medico-legal factors. Pilots exhibited the highest morbidity rate, the most frequent diseases being tuberculosis, psychoneurosis, otitis, mastoiditis, pleuritis, duodenal ulcer, hernia, appendicitis, arthritis, and spondylitis. In addition, the results are discussed in relation to professional factors and criteria for selection and control.

3045
Lalli, G.
(THE MICROCLIMATE ON BOARD OF THE MODERN PLANES FOR THE TRANSPORT OF PASSENGERS. II.) Il microclima a bordo dei moderni aerei da trasporto. II. — Rivista di medicina aeronautica (Roma), 17 (1): 27-66. 1954. In Italian, with English, French, Spanish, and German summaries (p. 62-63). DLC (TL555.A1R5, v. 17)

An analytical survey is presented of the literature dealing with temperature regulation, air conditioning, humidity control, pressurization, deodorizing, and draft prevention in passenger airplanes. The principal factors

to be considered in maintaining a comfortable and wholesome cabin climate are evaluated, such as rapidly changing outside temperatures and climates, solar radiation, heat exchange of the human body and of inner and outer cabin surfaces, rates of body evaporation, thermal gradients, and convective currents inside the fusilage. "Zones of comfort" and tolerance limits, as applied to the average passenger, are established and plotted in terms of humidity and temperature relationships. While recent improvements of thermal insulation and air conditioning have approximated the desired conditions of comfort, new problems arise from the extreme climatic conditions imposed by modern high-altitude and high-speed flight. (100 references)

3046

Lambertsen, C. J., and W. Bascom 1953

THE PERMISSIBLE LEVEL OF CARBON MONOXIDE IN INSPIRED AIR. — Univ. of Calif. Scripps Inst. of Oceanography, La Jolla. [Contract N6ori-111, T. O. 6] SIO Reference no. 54-3, Dec. 29, 1953. i + 10 p. AD 28 055 PB 111515

The amount of CO in air which is safe for humans to breathe was determined in order to set a criterion for self-contained underwater breathing apparatus. The degree of CO uptake by the blood depends on inspired CO concentration, upon time of exposure, upon exercise level, and upon ambient pressure. During exertion, respiration was found to increase by a factor of 3 (the exercise factor, EF). An equation was developed to determine the maximum allowable CO concentration of air supplied to the men working at increased pressures. This is concentration$_{(max)}$ CO (parts per 10,000) $= \frac{5}{\text{hrs} \times \text{atm.} \times 3\text{EF}}$ With this equation and a no-decompression table, two curves were developed for the maximum allowable CO at any depth. The curves intersected at 38 p.p.m., indicating that at lesser concentrations no symptoms of CO toxicity should develop regardless of pressure, time, or work rate. Despite the safety factors in the curves, an allowable limit of 20 p.p.m. CO is recommended for air to be used in underwater breathing devices. (AD abstract)

3047

Lanari, A. 1953

THE INTERCHANGE OF CARBON DIOXIDE AND OXYGEN IN THE SKIN AND THE MUCOSAE OF HUMAN BEINGS. — Acta physiologica latino-americana (Buenos Aires), 3 (1): 37-42. 1953. In English. DLC (QP1.A25, v. 3)

Gaseous exchange (O_2 and CO_2) through several types of skin was measured. In the normal (abdominal) skin the O_2 absorption amounted to 0.005 ml./cm.^{2}/hour, in the nasal mucous epithelium to 0.005/cm.^{2}/minute, and in the squamous epithelium of the prepuce and the glans to slightly less than in the nasal epithelium. The CO_2/O_2 ratio was higher than 1 in the first phase of the experiment but gradually fell below one. As the same processes apparently take place in the respiratory conducting airways, the concept of a respiratory epithelium becomes a relative one.

3048

Lane, J. C.

AIR-SICKNESS IS PREVENTIBLE: WHY NOT PREVENT IT? — Med. Jour. Australia (Sydney), 1 (13): 465-467. March 27, 1954. DNLM

The current status of drugs in the prevention of air sickness is reviewed. In summary, the author states that scopolamine, scopolamine and Benadryl, scopolamine aminoxide, Benadryl, Dramamine, Phenergan, lergigan, and avomine, are effective air-sickness preventives and have but minor side effects. He recommends the administration of Benadryl (25 mg.) with scopolamine (0.33 mg.) as the medication of choice.

3049
Langen, C. D. de
FAT METABOLISM IN HYPOXIA AND ITS CENTRAL REGULATION. — Aeromedica acta (Soesterberg, Netherlands), 3: 97-110. 1954. In English. DNLM

Observations of a parallel increase in blood protoporphyrin and fat content following anemia or after a stay in a decompression chamber led to an investigation of mechanisms governing this phenomenon. An attempt to interpret it as an effort of the body to restore normal osmotic pressure of the blood, must be considered erroneous, as fats have little or no influence on the osmotic pressure of the serum. Hyperlipemia produced in rabbits after blood-letting was found to be identical with that following hypoxia. It was found that there is a critical point of oxygen shortage at which the blood fat content suddenly increases. Severing of the spinal cord between the 3d and 4th thoracic vertebrae in experimentally anemic rabbits, resulted in an absence of hyperlipemia when blood-letting was continued. Investigation of the effects of barbituric acid compounds and hypnotics belonging to the methyl alcohol group on the metabolism of rabbits produced the same sudden increase in the serum fat content. Extracts from the anterior lobe of the hypophysis caused a similar increase in blood fat content. This effect was opposite to that produced by posterior lobe extracts. These results point to a central fat metabolism regulating mechanism of a neurogenic nature, localized in the diencephalon. Livers of rabbits kept on repeated dosages of veronal or reduced to chronic anemia or kept hypoxemic for a longer time showed enlargement and accumulation of fat. These changes indicate that the liver is the central organ involved, in response to a central regulating mechanism. It is concluded that the centers in the diencephalon become affected at a certain critical point under sufficiently severe hypoxemic conditions and that certain changes in the general metabolism result from it.

3050
Langen, C. D. de
[WENCKEBACH PERIODS IN THE ELECTROCARDIOGRAM OF COMPLETELY HEALTHY YOUNG MEN] Wenckeback'se perioden in het electrocardiogram van volkomen gezonde jonge mannen. — Aeromedica acta (Soesterberg, Netherlands), 3: 111-114. 1954. In Dutch. DNLM

Statistics compiled over a number of years of deviations observed in the electrocardiograms of applicants in the American and Canadian Air Force have shown the appearance of the right bundle branch block to be harmless. The left bundle branch block with a few exceptions does not exhibit the same harmless character. The author describes the rare occurrence of a pronounced Wenckebach period observed in the electrocardiograms of a few nineteen-year-old applicants in the past year. The intermittency of this deviation was brought out by the fact that exercise and, in one case, a meal shifted the P-R interval within the normal range. Occasionally, a regular instead of intermittent lengthening of the P-R interval was observed. As the Wenckebach periods disappeared after administration of atropine and the P-R interval sank under 0.20, this deviation may be due to vagotonic influences. A closer inspection of such electrocardiograms revealed fluctuations of the P-R intervals from over 0.22 to as low as 0.16. Again, exercise or breathing deeply shortened the P-R interval. Due to a possible association of skipped heart beats with losses of consciousness in varying degrees, rejection of such candidates is recommended until the harmlessness of the Wenckebach periods observed in youth is established beyond doubt through repeated follow-up EEG.

3051
Langley, L. L.,
P. W. Scokel, and E. J. Moore
ROLE OF HYPOGLYCEMIA AND CARBON DIOXIDE IN THE REACTION TO STRESS. — Endocrinol., 54 (4): 425-430. April 1954.
DLC (QP187.A25, v. 54)

The role of hypoglycemia and CO_2 in the reaction to hypoxia and cold was investigated in male rats. It was found that hypoxia produces a transient hypoglycemia which reaches a maximum after 4 hours exposure to an altitude of 20,000 feet. Thereafter the blood sugar returns to normal. Rats exposed to 3°C. for 4 hours showed a sharp decline in ascorbic acid, cholesterol, and the number of eosinophils. However, if 5% CO_2 was added to the cold atmosphere, the decline was significantly less, although the values for ascorbic acid, cholesterol, and eosinophils were still significantly below the control values. The CO_2 thus partially prevents the adrenal activation in response to cold stress. These results combined with previous work and other published data are discussed, and the suggestion is offered that there are at least three lines of defense open to the stressed animal. It is believed that (1) adrenaline is secreted, (2) adrenocortical hormones are utilized and thus decreased in blood circulation, and (3) the hypothalamus is stimulated directly. The authors conclude that, as a result of hyperventilation observed in both high altitude chamber and in the cold room, in severe stress the ensuing hypocapnia probably potentiates these defense mechanisms. (Authors' summary, modified)

3052
Langraf-[Favre], F., 1953
L. Pircher, and K. Tanner
[HEARING OF PILOTS AND AURICULAR PROTECTION] Audition des pilotes et protection auriculaire. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 291-299. In French, with English summary (p. 299). DNLM (W3.C0943a)

The efficiency of individual auricular protectors in preventing deafness in pilots is investigated. Vocal audiometric tests performed in subjects exposed to airplane noise showed that modern protective sets, constructed according to the principle of by-pass filters (Selectone, model K) do not impair the intelligibility of radio messages. On the contrary, the use of protectors in intense noise appears to improve auditory efficiency. It is concluded that deafness in aviators manifests itself first of all in auditory deficit under silent or relatively quiet conditions (during conversation); but when exposed to intense airplane noise the damaged ear shows almost normal behavior. It is for this reason that some pilots with impaired hearing are kept in service. (Authors' summary, modified)

3053
Langraf-[Favre], F. 1952
[SOME ASPECTS OF THE PROBLEM OF DEAFNESS IN AVIATION] Quelques aspects du problème de la surdité dans l'aviation. — Société française d'oto-rhino-laryngologie: Congrès de 1952, Comptes Rendus des Séances (Paris), 59: 97-101. 1952.
DNLM (W1S0719, v. 59)

The problem of deafness among aviation personnel has been magnified by the introduction of modern high-intensity noise emitting engines, particularly the turbojet engine. Atmospheric pressure changes and exposure to static noise in radio communications pose a further menace to the aviator's hearing. Various equipment has been developed to prevent hearing loss. Ways of selecting personnel not readily susceptible to hearing damage should be investigated.

3054
Lansberg, M. P.
[AERONAUTICAL AFFLICTIONS OF THE MIDDLE EAR AND FUNCTIONAL DISTURBANCES OF THE EUSTACHIAN TUBE] Aeronautische aandoeningen van het middenoor en functiestoornissen

van de tuba eustachii. — Nederlandsch tijdschrift voor geneeskunde (Amsterdam), 98 (20): 1354-1356. May 15, 1954. In Dutch, with English summary (p. 1356) DNLM

Middle ear infections (barotrauma, aerotitis media, and reoccurrence of these diseases under conditions of chronically low barometric pressure), which may be encountered in aviation medicine, are discussed in terms of their occurrence, causes, and methods of diagnosis and treatment. The difficulties of interpreting tubal function tests are pointed out. (Author's summary, modified)

3055
Lansberg, M. P.
[THE HEARING REQUIREMENTS FOR FLIGHT PERSONNEL] Gehoor-eisen voor vliegend personeel. — Aeromedica acta (Soesterberg, Netherlands) 3: 45-61. 1954. In Dutch. DNLM

"Acoustic fitness" for flyers is termed insufficient if the subjects cannot achieve 95% to 100% discrimination of flight information relayed under flying conditions, regardless of laboratory results. However, even if a 100% discrimination is achieved, rejection is indicated if threshold audiograms or speech range data show considerable deviation from established norms. A hearing loss of 40 db. at frequencies of 500, 1000, 2000, 3000 c.p.s. in the better ear, and of 60 db. in the worse ear, is to be regarded as the maximum allowable threshold. Assuming an optimal intelligibility of acoustical information, attention should be directed not only toward the pilot's acoustic fitness but also, toward intelligibility of control-tower operators' speech and toward improvement of radio communication systems. (Author's summary, translated and modified)

3056
Lansberg, M. P.
[ONCE MORE ON "TESTS FOR SEASICKNESS"] Nogmaals "Keuring op zeeziekte." — Nederlands militair geneeskundig tijdschrift (Den Haag), 7 (11): 288-290. 1954. In Dutch.
DLC (RC971.N4, v. 7)

A criticism is presented of the tests for motion sickness as described by G. de Wit (item no. 3662) since both, the parallel-swings method and cupulometry are still in the experimental stage. The cupulometric findings obtained at the Nationaal Luchtvaartgeneeskundig Centrum have been ambiguous in regard to predicting the severity of motion sickness and have contributed mainly towards a better understanding of labyrinthine physiology. The nature of motion sickness is as yet not fully understood. The proponents of the labyrinthine theory place the pathological link in an oversensitive labyrinth, which is unable to adapt to exposure to a violent nonphysiological stimulus complex. According to others, motion sickness originates centrally in faulty integration and resolution of contradictory messages from various sense organs. The author does not regard either of these hypotheses as proven. De Wit's findings, although of experimental interest, do not offer sufficient proof of reliability or validity to warrant the use of cupulometry as a predictive instrument in the selective test battery for naval trainees.

3057
Lansberg, M. P.
SOME CONSIDERATIONS AND INVESTIGATIONS IN THE FIELD OF LABYRINTHINE FUNCTIONING. I. THRESHOLD AND OTHER SENSATIONS MEASURED ON THE PARALLEL SWING. — Aeromedica acta (Soesterberg, Netherlands), 3: 209-219. 1954. In English. DNLM

A mechanical analysis of an ideally suspended and balanced parallel swing shows gravitational and centrifugal accelerations as effective forces. The mathematical representation in existing literature has been found in error, since it introduces a new acceleration, nonexistent as such. A comparison of

otolithic stimulation values measured on the parallel swing by the author, with those obtained by others shows the latter to be considerably higher. The author raises the question whether the higher figures had actually been obtained as a combination of vestibular stimuli and body sensations, rather than on the basis of otolithic stimuli alone. Counter-rolling movements of the eyes around the transversal axis did not give a reliable indication of otolithic stimuli. This statement was confirmed in the following way: two methods of registering eye-movements were devised — (1) an after-image was projected upon a board fixed above the test person's head, and (2) a direct recording of ocular movements was made possible by taking advantage of the cornea-retina potential. No systematic eye movements, to any degree corresponding to the swing accelerations, could be registered by any of these methods.

3058
Lansberg, M. P.
SOME CONSIDERATIONS AND INVESTIGATIONS IN THE FIELD OF LABYRINTHINE FUNCTIONING. II. ON THE LIMIT OF PHYSIOLOGIC TOLERANCE OF THE SEMICIRCULAR CANALS. — Aeromedica acta (Soesterberg, Netherlands), 3: 221-230. 1954. In English DNLM

The correlation between sustained and physiologically sustainable vestibular stimuli is discussed. The latter of these items, which comprises the tolerance limit, is dealt with by considering the basic experimental and theoretical investigations of van Egmond, Groen, and Jongkees. One of their conclusions fixating the upper limit of physiologic vestibular stimuli at 4° to 6° cupular deflection is considered by the author as too pessimistic and contradictory to recordings of head movements in a "no-gesture" involving large degrees of cupular deflections. Since these cannot be considered unphysiologic, the author suggests that either Groen's equation does not give a faithful representation of cupular deflections, or stimuli exceeding 30° to 40° cupular deflections may not necessarily inflict temporary or permanent damage to the labyrinth. This suggests further investigations as to vestibular adaptation, fatigue, and trauma. Meanwhile, a more optimistic outlook is offered to those exposed to large vestibular stimuli during acrobatic aerial maneuvers or during vestibular test procedures such as the old Barany test. (Author's summary, modified)

3059
Lansberg, M. P.
SOME CONSIDERATIONS AND INVESTIGATIONS IN THE FIELD OF LABYRINTHINE FUNCTIONING. III. CHARACTERISTICS OF THE CALORIC NYSTAGMOGRAM. — Aeromedica acta (Soesterberg, Netherlands), 3: 231-239. 1954. In English. DNLM

The labyrinth plays a major role in the occurrence of motion sickness. Abnormalities of the peripheral organ and disturbances of the pathways in the central nervous system will often be revealed by vestibular tests. It is highly desirable for these reasons to include a reliable vestibular test in the medical check-up of pilots and pilot candidates. In this experiment full tracings of the caloric nystagmogram were performed on 60 pilot candidates. Results revealed unexpectedly large individual differences and differences between the right and left side. An explanation is offered that a cold stimulus to one labyrinth, in addition to inducing a fluid current in the semicircular canals, alters the condition of both the crista and the macula receptors, and possibly changes the viscosity of the endolymph and the elasticity of the cupula. Also, stimuli coming from the two labyrinths after unilateral douching will always be conflicting, and consequently a central compromise is found. Caloric testing of candidates was discontinued due to low reliability and poor prediction values.

3060
Lansberg, M. P.
SOME CONSIDERATIONS AND INVESTIGATIONS IN THE FIELD OF LABYRINTHINE FUNCTIONING. IV. INFLUENCES OF VESTIBULAR STIMULATION UPON ELECTRO-ENCEPHALOGRAM, ELECTRO-CARDIOGRAM AND RESPIRATION. — Aeromedica acta (Soesterberg, Netherlands), 3: 241-246. 1954. In English. DNLM

A simultaneous registration of nystagmus, E.E.G., E.C.G., and respiration was achieved on an 8-channel electroencephalograph. A rabbit as test animal was suspended in a box that was rotated by a simple torsion-swing device. It was found that the influence of vestibular stimulation, with exemption from optokinetic and tactile factors, changed the pattern of the E.E.G., E.C.G., and of the respiration curve concurrently with the behavior of the nystagmus (Author's summary)

3061
Lansberg, M. P.
SOME CONSIDERATIONS AND INVESTIGATIONS IN THE FIELD OF LABYRINTHINE FUNCTIONING. V. VESTIBULAR ADROITNESS TEST (V.A.T.), TREPAESTHETIC TEST, AND MODIFIED BARANY TEST. — Aeromedica acta (Soesterberg, Netherlands), 3: 247-254. 1954. In English. DNLM

The Vestibular Adroitness Test was designed to test a subject's vestibular skill and adaptation within a natural environment and in full use of all sensory receptors. The following procedure is used: A seated subject is rotated for one minute with constant speed of 180°/sec.; during the first 20 seconds he is in an upright sitting position; during the following 20 seconds his head is bent 90° forward; during the last 20 seconds he sits again upright. After the rotation is stopped abruptly, the subject is asked to descend and stand alone with both feet together and eyes open. As soon as he is able to do so, he is asked to stand 5 seconds on one foot His behavior and autonomic nervous reactions are evaluated. In contrast to the Trepaesthetic Test and the Modified Barany Test, which both investigate only horizontal-canal functions, the V.A.T. involves all three semicircular canals and otoliths. Early in 1954, the V.A.T. was incorporated in the medical examination of pilot candidates. Preliminary reports indicate a correlation between poor V.A.T. performance and failure early in flight training. Its value in prediction of equilibrial skill has yet to be determined, however, it may serve as a reliable indicator of deficient equilibrial aptitude.

3062
Lansberg, M. P.
SOME CONSIDERATIONS AND INVESTIGATIONS IN THE FIELD OF LABYRINTHINE FUNCTIONING. VI. THE INFLUENCE OF ANTI-MOTION SICKNESS DRUGS UPON VESTIBULAR TESTS, REACTION TIME, AND ATTENTION TEST. — Aeromedica acta (Soesterberg, Netherlands), 3: 255-266. 1954. In English. DNLM

Effects of anti-motionsickness drugs were investigated in connection with possible use by experienced pilots in flight. Another proposed use would be for adapting airsickness-prone trainees. The following drugs were selected: Postafene, Largactil (chlorpromazine), Phenergan, Soneryl, Suprimal, and Ortedrin. The experiments were carried out in two parts: (1) The effects of the above drugs were investigated on rabbits and pigeons. In a torsion-swing set-up, evaluations were made of the E.E.G., the E.C.G., the Respirogram, and the vestibular reflexes (such as nystagmus, Magnus and De Kleyn). And (2) 92 healthy young men were submitted to a battery of vestibular tests on one day and a battery of control tests the following day. Tests given on the first day were: the Trepaesthetic Test, the Modified Barany Test, and the Vestibular Adroitness Test. On the second day,

a reaction time determination was made, then the subjects received anti-motion-sickness tablets; 1-2 hours later the following tests were administered: a reaction time determination, the Bourdon-Wiersma attention test (stipple test), and the three vestibular tests (T.A.T., M.B.T. and V.A.T.). In the animal experiments in which higher dosages were used, nystagmus and other vestibular reflexes were found to be markedly influenced by Largactil, Phenergan, and Soneryl. The phenomena observed consisted of two stages: (1) nystagmus increase (release from cortical and subcortical depressive influences), and (2) a depression of central vestibular connections resulting in effacement of nystagmus beats. No definite conclusions could be reached about the effects on human subjects, because only small dosages of drugs were administered and the test subjects were a highly selective group. However, the author believes that in instances where the V.A.T. reveals severe vegetative reactions, the drugs would exert a stabilizing influence on homeostasis. The ban of these drugs for use by trained pilots should not be lifted at the present time.

3063
La[n]sberg, M. P.
AEROMEDICAL ASPECTS OF MIDDLE EAR PRESSURE MEASUREMENTS. — Jour. Aviation Med., 25 (3): 295-303. June 1954. DLC (TL555.A1A4, v. 25)

A discussion is presented of the use of van Dishoeck's pneumophone for determining middle-ear pressure. It is emphasized that the pneumophone gives no certain indication of the functional adequacy of the Eustachian tube under aeronautical conditions, and that abnormal pneumophone readings should be interpreted with great care. The relationship of barotrauma to aerotitis media is given.

3064
Lansdell, H.
EFFECT OF FORM ON THE LEGIBILITY OF NUMBERS. — Canad. Jour. Psychol. (Toronto), 8 (2): 77-79. June 1954. DLC (BF1.C3, v. 8)

A new set of numbers was designed, which breaks away from the tradition of using a uniform stroke width for number forms and instead makes as much use as possible of more easily discriminated form components. Six observers were shown 200 numbers each of an experimental set, Mackworth numbers, and Mound's revision. The numbers were presented singly under difficult viewing conditions. Comparison of the legibility of these numbers after a brief practice session gave 67.4% correct readings of experimental numbers as compared to 51.5% for Mackworth numbers, and 51.4% for Mound's revision. (Quoted in part)

3065
Latham, F.
THE MEDICAL PROBLEMS OF THE AIRCRAFT ENGINEER. — Jour. Soc. Licensed Aircraft Engineers (London), 3 (10): 2-9, Oct. 1954; discussion, 3 (11): 1-5, Nov. 1954.
DLC (TL501.S63752, v. 3)

Factors of potential danger to health commonly encountered by the aircraft engineer are discussed, such as exposure to various kinds of vibrations (subsonic, sonic, and ultrasonic) and toxic substances, and the hazards of pressure-cabin testing. The physiological effects of vibration and noise at various intensities and frequency bands are summarized, with particular reference to ensuing hearing loss and noise reduction. Toxic substances associated with aircraft engineering are gasoline, kerosene, liquid oxygen, hydrogen peroxide, and hydraulic fluids. Pressure-cabin testing may lead to damage to the middle ear if structural failure should occur. The discussion following the paper deals mainly with questions related to noise and hearing loss.

3066
Lawrence, M.,
and C. L. Blanchard
PREDICTION OF SUSCEPTIBILITY TO ACOUSTIC TRAUMA BY DETERMINATION OF THRESHOLD OF DISTORTION. — Indus. Med. and Surg , 23 (5): 193-200. May 1954.
DLC (RC963.A37, v. 23)

On the assumption that susceptibility to acoustic trauma can be predicted by testing with low level sounds to detect the point at which the ear begins to introduce non-linear distortion, a new test for prediction of noise tolerance was devised and experimentally validated. Based on the production of harmonics as an evidence of non-linear distortion, using the beat-tone method, non-linearity thresholds were obtained at different frequencies for human subjects. The reliability was shown to be good by test-retest correlation, which fell within 5 db. of the first test measures. Since the locus of non-linear distortion had been shown to be the same as the source of electrical potential, namely the sensory cells of the organ of Corti, validation was carried out on guinea pigs, in which actual acoustic trauma was produced, and the extent correlated with the threshold of non-linearity. The preliminary results show that the threshold of non-linearity for frequencies including and above 1000 c.p.s. serves in the guinea pig as an indicator of the ear's susceptibility to acoustic trauma. This may be the case in the human ear as well, for, as shown in human experiments, there is not as great a range of individual differences at the 500 c.p.s. as at the 2000 c.p.s. threshold of non-linearity. Industrially, this test may be used to detect supersensitive ears, which might suffer permanent damage at noise levels which do not affect the normal ear.

3067
Lazo, J.
THE DEVELOPMENT OF INSPECTION METHODS AND CRITERIA FOR OPTICAL DISTORTION IN COCKPIT ENCLOSURES. III. DETAILS OF A PROPOSED METHOD FOR INSPECTING AIRCRAFT TRANSPARENCIES FOR VISUALLY OBJECTIONABLE DISTORTION. — Naval Air Experimental Station. Aeronautical Medical Equipment Lab., Philadelphia, Pa. Topical Report no. XG-T-225, Sept. 9, 1954. 2+10 p. (Project no. NAM AE-4405). AD 46 504 PB 116297

Details are presented of the distortion inspection test method developed from laboratory and analytical studies. The method is considered a practical technique for determining visual acceptability and is recommended for adoption as the specification inspection method for visually objectionable distortion in aircraft transparencies. Reports of other methods and proposals are listed. (AD abstract)

3068
Lazo, J.
HUMAN ENGINEERING INVESTIGATION OF INTERIOR LIGHTING OF NAVAL AIRCRAFT. I. COLORING FOR SINGLE SEAT AIRCRAFT COCKPITS. — Naval Air Experimental Station. Aeronautical Medical Equipment Lab., Philadelphia, Pa. (Project no TED NAM EL-52004, Topical Report no. XG-T-214). April 23, 1954 15 p., 6 plates. AD 36 619 UNCLASSIFIED

A total of 11 pilots were asked to evaluate the reflectivity levels of controls and dials and relative suitability of color schemes of neutrally painted cockpits in four types of naval aircraft during routine day-and-night flights under as many weather conditions as possible. The following conclusions were reached: (1) Paints having a higher reflectivity than the black paint used presently for cockpit surfaces reduced the brightness contrast between the interior and exterior of the aircraft, provided a better illumination during daylight flights, and increased brightness between controls and dials. (2) Neutral color gray was not objectionable for certain cockpit surfaces

when the reflectivity was not greater than 23%; a reflectivity of 29%, however, resulted in adverse comments. (3) Blue or green colored cockpit surfaces, approximately 22% reflective, were not as well received as the neutral color paints. (4) The use of grey color around dial faces, including instrument lighting fixtures, improved the appearance and utility of the instrument panel in daylight. (5) Control knobs should be painted black for proper contrast to grey-painted surfaces, except for emergency handles, which may have special coloration.

3069
Learner, D. B.
PSYCHOLOGICAL FACTORS OF MORALE. — Naval School of Aviation Medicine, Pensacola, Fla. Research Report no. NM 001 058.21.02. May 7, 1954. 9 + ix p. AD 46 697
UNCLASSIFIED

A morale questionnaire filled out by 127 naval aviators was factor analyzed by the Wherry-Gaylord-Winer iterative method. Five factors were identified: work load distribution; interaction among group members; status values derived from profession; satisfaction derived from job; and personal adjustment to environment. The analysis indicated that self-appraisal of status, prestige, and satisfaction explain morale attitudes better than the factors of group interaction and the estimates of "guessperts." Suggestion of an instrument combining peer ratings and projective estimates to measure morale is made. (Author's abstract)

3070
LeBlanc, J.,
M. Stewart, G. Marier, and M. G. Whillans
STUDIES ON ACCLIMATIZATION AND ON THE EFFECT OF ASCORBIC ACID IN MEN EXPOSED TO COLD. — Canad. Jour. Biochem. and Physiol. (Ottawa), 32 (4): 407-427. July 1954.
DLC (R11.C37, v. 32)

Large doses of ascorbic acid (525 mg./day) improved the resistance of men exposed to cold (60° F., clad in shorts, socks and low shoes) and fed a survival ration (carbohydrates) which provided 550 cal./day. No beneficial effect was observed when the subjects were fed a normal ration supplemented with ascorbic acid. A definite acclimatization to cold was observed from the fifth day of exposure to the end of the experiment with survival rations. No acclimatization was observed when subjects were fed normal rations, but the changes in 17-ketosteroid excretion indicated some adaptation of the adrenal cortex to the imposed stresses. These observations were based on blood analyses, measurements of metabolic exchanges, water balance, body temperature, adrenal activity, descriptions of foot troubles, and other subjective evidence. It was concluded that survival rations, composed exclusively of carbohydrates, do not prevent the acclimatization of men exposed to cold, nor the utilization of body proteins and fats. It was estimated that the calorie requirement for relatively inactive persons living in a room at 60° F., wearing shorts and footwear only, is approximately 2800 cal./day, as compared with the requirement of 2400 cal./day for persons living in a comfortable environment.

3071
Lee, M. F.,
J. P. Henry, and E. R. Ballinger
BASIC REQUIREMENTS FOR SURVIVAL OF MICE IN A SEALED ATMOSPHERE. — Jour. Aviation Med., 25 (4): 399-406, 432. Aug. 1954.
DLC (TL555.A1A4, v. 25)

Same as item 1712, vol. II.

3072
Leeuwe, H.
[SOMATOTYPING II] Somatotyping II. — Aeromedica acta (Soesterberg, Netherlands), 3: 187-207. 1954. In Dutch.
DNLM

This is the continuation of a report on somatotyping of aviation candidates

as conducted by the Nationaal Luchtvaart Geneeskundig Centrum (see item no. 2280, vol. II). Somatotyping was intended to establish a specific body type for pilots and thus aid in the selection of candidates. An immediate gain was the determination of average body proportions, average limb lengths and incidences of lefthandedness in recruits. The report includes tables comparing the height and weight of aviation candidates and army recruits, corrected for age, for the year 1953. On the whole, the average aviation candidate is slightly taller than the army recruit. The average height and weight for aviation candidates was found to be 177.4 cm., and 63 kg. respectively. Nineteen per cent of the candidates were found to be left-handed, as determined by a "coal shoveling test."

3073
Lehalle, P. 1953
[THE PHYSICAL TRAINING OF FLYING PERSONNEL: THE PSYCHO-PHYSIOLOGIC TRAINING OF THE JET PILOT] L'entrainement physique du personnel navigant: l'entrainement psycho-physiologique du pilote d'avion a réaction. — Forces aériennes françaises (Paris), no. 81: 331-339. June 1953. In French.
DLC (UG635.F8F66, no. 81)

The psycho-physical training peculiar to the needs of the jet pilot is discussed. Equilibrium, organizational perception and reaction speeds, coordination, and respiratory control may be tested and developed by "synthesis" courses, in which actions involving these qualities are sequentially and variably performed.

3074
Leibowitz, H. W.,
and J. F. Lomont
THE EFFECT OF GRID LINES IN THE FIELD OF VIEW UPON PERCEPTION OF MOTION. (One of a Series of Reports on Perception of Motion) — Univ. of Wisconsin, Madison (Contract AF 18(600)-54); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-201, March 1954. iii + 8 p. (RDO no. 694-49). AD 38 210
UNCLASSIFIED

The minimum discriminable target velocity was investigated for exposure durations of 1/4 and 16 seconds, for target luminance values of .016 and 500 millilamberts, and both with and without vertical grid lines in the field of view. The grid lines lower the threshold velocity by an average of 48% for the 16 second duration, but not for the shorter exposure. Increase in either luminance or duration will also lower the threshold. The magnitude of the change due to an increase in luminance is less for the longer duration. The data are interpreted as resulting from the "inference" of movement based on observation of the target in successive positions for the longer duration of exposure. Significant individual differences and practice effects were observed. (Authors' abstract)

3075
Leibowitz, H. W.,
and J. F. Lomont
THE EFFECT OF LUMINANCE AND EXPOSURE TIME UPON PERCEPTION OF MOTION. — Univ. of Wisconsin, Madison (Contract AF 18(600)-54); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-78, March 1954. iii+9 p. (RDO no. 694-49). AD 35 163
PB 133516

An experiment was performed on the relationship of foveal movement perception to target luminance with exposure time as a parameter over a wide range of values. The minimum target movement rate for a constant exposure time which can be detected was referred to as the isochronal threshold velocity. Threshold values were obtained for a wide range of luminance values in foveal vision at various durations of exposure. Results

indicate that threshold velocity decreases with increase in luminance, rapidly at first and then more slowly, before reaching a limiting value, after which increase in luminance has little effect. Also, an increase in luminance and exposure time improved motion discrimination. The systematic changes in the isochronal threshold velocities which occur with variation in exposure time above the critical duration imply that the mechanisms involved in motion perception are not identical with those involved in the other visual measures. (AD abstract)

3076
Lemke, G. A. 1953
HIGH-ALTITUDE COCKPIT COMFORT. — Flight (London), 64 (2341): 726-727. Dec. 4, 1953.
DLC (TL501.F5, v. 64)

Cockpit air-conditioning for high-altitude flight is described, and the problems of pilot visibility as affected by: (1) cockpit inside-fog (caused by water condensation), and (2) exhaust smoke entering the engine intake and passed into the cockpit are noted. Other services including anti-icing, windscreen de-misting and rain clearance, fuel-tank pressurization and cockpit canopy seals are presented. In addition, the author suggests a modified air-conditioning and ancillary-drive system aimed at reducing to the minimum the aircraft performance penalty caused by engine compressor bleeding, and at lessening the weight of the refrigeration and power systems.

3077
Leonard, J. A. 1953
ADVANCE INFORMATION IN SENSORI-MOTOR SKILLS. — Quart. Jour. Exper. Psychol., 5 (4): 141-149. Nov. 1953. DLC (QP351.E95234, v. 5)

Two experiments were carried out to demonstrate the effects of advance information. In both cases greater smoothness of performance was found to be possible when advance information was available. This effect was considered more important than the reduction in response time. Both effects were reflected in a reduction of the stopping times between successive responses. (Author's abstract)

3078
[Lett, J. E.] 1953
TECHNICAL TOPICS: ACOUSTIC TRAUMA. — Jour. Soc. Licensed Aircraft Engineers (London), 2 (7): 1. July 1953. DLC (TL501.S63752, v. 2)

A report is made of a paper read before the Institute of Aeronautical Sciences in America by Lt.-Col. J. E. Lett of the U.S.A.F. School of Aviation Medicine. A decrease in efficiency among aircraft maintenance personnel may be expected from physical and psychological damage due to noise. Prolonged exposure at a level above 90-95 decibels, encountered particularly in work with the gas turbine engine, is necessary for permanent injury. Qualifying medical examinations, periodic check-ups, alternation of conditions of noise with periods of quiet, and the development of protective ear plugs and helmets are recommended.

3079
Lett, J. E.
EAR, NOSE AND THROAT PROBLEMS IN THE UNITED STATES AIR FORCE. — Annals Otol., Rhinol., and Laryngol., 63 (1): 116-129. March 1954.
DLC (RF1.A6, v. 63)

The following aspects of military aviation are pertinent to otolaryngology: (1) communication and noise, (2) special orientation and equilibration, (3) atmospheric pressure changes, and (4) direct stress effects of high altitude. With the advent of the jet engine, aviation otology has shifted its attention from the pilot to the maintenance crew, since the sealed cabin of jet aircraft eliminates nearly all of the damaging higher frequencies of sound from the cockpit. A thorough indoctrination program for the prevention of hearing damage from noise is needed to obtain full cooperation

of ground crews. Problems of aerial equilibration in flight are reviewed with respect to illusions. The necessity of conscious ventilation of the middle ear during descent, to prevent aerotitis, is stressed. The use of oxygen in high altitude flights is thought to be a causative factor in hyperplastic rhinitis noted in pilots. Further research is necessary to determine the requirements for a sealed cabin as far as moisture, oxygen tension, temperature, and waste gas tolerances are concerned, and to make flights at extremely high altitude levels possible.

3080
Leulier, J.
[BASAL METABOLISM AND OXYGEN CONSUMPTION ON HIGH MOUNTAINS] Le métabolisme de base et les dépenses d'oxygène en haute montagne. — Concours médical (Paris), 76 (52): 4865-4866. Dec. 25, 1954. In French.
DNLM

Basal metabolic studies (oxygen consumption) performed in a mountain shelter at approximately 3,000 m. show an average increase of +22% in two-thirds of the subjects and a decrease of -27% in the remaining third. After 3 minutes of the experiment, subjects with low basal metabolism fainted due to anoxemia. Fainting from the paradoxical effect of O_2, as observed in previous research, is compared with fainting observed in this experiment. The measurement of basal metabolism with effort showed an increase in O_2 consumption and no evidence of fainting. A transitory disorder of the endocrine regulatory centers, of the cortico-thalamic centers, and of the anterior pituitary is also noted in subjects unable to adapt themselves to high altitude.

3081
Leulier, J.,
and P. Dumas
[USE OF THE HELICOPTER FOR RESCUE WORK IN HIGH MOUNTAINS] L'utilisation de l'hélicoptère pour le sauvetage en haute montagne. — Concours médical (Paris), 76 (36): 3309-3310, 3313. Sept. 4, 1954. In French.
DNLM

Various illnesses and injuries such as shock, chill, menigeal and abdominal hemorrhages, peritonitis, and paralysis following spinal fractures are often incurred in mountain climbing, and the need for rapid and gentle rescue is indicated. Three such cases are cited to show how helicopters were utilized to bring first aid and evacuate injured mountain climbers from altitudes as high as 3,200 meters.

3082
Levine, M. 1953
TRANSFER OF TRACKING PERFORMANCE AS A FUNCTION OF A DELAY BETWEEN THE CONTROL AND THE DISPLAY. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-237, Nov. 1953. v + 27 p. (RDO no. 694-44). AD 29 359
UNCLASSIFIED

Using a one-dimensional, compensatory tracking task, an investigation was made into the way tracking performance transfer as a function of changes in an exponential delay inserted between the operator's control and his display. The research was divided into two studies. The first investigated performance on a transfer task containing a 3.000 second exponential delay following training with delays of either .015, .150, .900, 2.000, or 3.000 seconds in the system. The second investigated performance on a transfer task containing a delay of .015 seconds following training with delays of either .015, .900, or 3.000 seconds in the system. The results show that: (a) when operators transfer to the longest delay, training with any of the shorter delays is equally efficient; (b) when operators transfer to the shortest delay, training efficiency decreases with decreasing similarity of the training and transfer situations. This suggests that the design engineer concerned with specifying the degree of simulation for

instrument delays should consider the direction away from identity which lower fidelity will take. Shorter simulator delays would probably be permissible, whereas longer simulator delays should be viewed more critically. The results also suggest that training conditions should be somewhat easier than operational conditions for maximal training effectiveness. The fact, however, that the opposite conclusion has been confirmed in a number of previous studies renders a practical application inadvisable at present. (Author's abstract)

3083
Lewis, B. M., 1952
and L. Dexter
EFFECTS OF ACUTE HYPOXIA ON THE CIRCULATION OF THE DOG [Abstract]. — Amer. Jour. Med., 12 (1): 109. Jan. 1952.
DLC (RC60.A5, v. 12)

Dogs were anesthetized with morphine-urethane-chloralose. Catheters were inserted into the pulmonary artery and left atria; cannulas were placed into the femoral artery and vein. Pressures were recorded with electromanometers and cardiac outputs estimated by the Fick method. Breathing mixtures containing 2.5 to 10 per cent oxygen were administered. With 10 per cent oxygen for one to five hours, arterial saturation was 50 to 75 per cent, cardiac output remained normal or increased and left atrial and venous pressures remained unchanged. With 2.5 to 5 per cent oxygen for five to twenty minutes, arterial saturation was 4 to 25 per cent. If arterial saturation was approximately 25 per cent, cardiac output increased without an apparent increase in ventricular filling pressure (Group I). When saturation was below 25 per cent, left atrial and sometimes systemic venous pressure rose (Group II). Cardiac output increased in a third (Group IIa). In the others, flow did not increase despite increased left ventricular filling pressure (Group IIb). Here, sharp reductions in oxygen supply and cardiac work occurred. When left atrial pressures rose to 20 mm. Hg or more, gross pulmonary edema occurred. Pulmonary vascular resistance showed no significant change with hypoxia from the control values. The primary response to hypoxia is an attempt to maintain normal oxygen supply to the tissues by increasing cardiac output. This may or may not be accomplished by an increased ventricular diastolic filling pressure. The end result of severe anoxia is acute left and then right ventricular failure with death in acute pulmonary edema. Hypoxia apparently does not alter pulmonary vascular resistance. (Quoted in full)

3084
Lewis, B. M.,
and J. W. Morton
EFFECTS OF INHALATION OF CO_2, MUSCULAR EXERCISE AND EPINEPHRINE ON MAXIMAL BREATHING CAPACITY. — Jour. Applied Physiol., 7 (3): 309-312. Nov. 1954.
DLC (QP1.J72, v. 7)

Maximum breathing capacity (MBC) was increased during inhalation of 7 1/2% CO_2 and during hyperpnea following exercise. It was increased by the injection of adrenalin, but not by breath holding. It was decreased by previous ventilation. Neither respiratory drive alone nor prior warm-up of the respiratory muscles alone seems to be a satisfactory explanation of the increased MBC during exercise and CO_2 inhalation. Liberation of endogenous adrenalin, however, may be an important factor noted in these cases. It is also possible that the interaction of several factors, which individually are ineffective, may, combined, lead to an increase in MBC. (Authors' summary, modified)

3085
Lewis, D. H.
EFFECTS OF EXTERNAL PRESSURIZATION UPON CARDIOVASCULAR SYSTEM IN DOGS. — Federation Proceedings, 13 (1[I]): 88. March 1954.
DLC (QH301.F37, v. 13)

In anesthetized dogs, external pressure was applied by means of a modified anti-blackout suit that encased the lower half of the animals' body up to the rib margin. Measurements were made by means of Statham gauges of arterial blood pressure, pulmonary arterial pressure, right auricular and ventricular pressures, and pressures from various sites in the venae cavae. Pressures were also recorded from the surface of the abdomen and from the rectum. With suit pressures of the order of 100 mm. Hg or less, applied for 5-10 seconds, there was an immediate rise in mean and pulse pressures in both the greater and lesser circuits proportional to the rise in suit pressure. The rise in pulmonary arterial pulse pressure was immediate and was noted some 3-7 seconds later in the aorta. With the higher levels of suit pressure there was often some delay in the return of right-sided pressures to control values, and abnormalities of cardiac rhythm. These animals showed no gross pathological changes at autopsy. With suit pressures in the range of 150-200 mm. Hg, there was often a pronounced delay in return of right heart pressures to control values with marked abnormalities of cardiac rhythm. Autopsy revealed dilatation of the right side of the heart with gross hemorrhages in the lungs. (From the author's summary)

3086
Lewis, P. R.,
and M. C. Lobban
PERSISTENCE OF A 24 HR. PATTERN OF DIURESIS IN HUMAN SUBJECTS LIVING ON A 22 HR. DAY [Abstract]. — Jour. Physiol. (London), 125 (1): 34P-35P. July 28, 1954.
DLC (QP1.J75, v. 125)

The diurnal excretory rhythm, characterized by oliguria during normal sleep and increased water and salt excretion during the day, was studied in eight subjects living as an isolated community in Spitzbergen for the months of July and August, 1953. The ages of these subjects, five male and three female, ranged from 21 to 33 years. For the major part of the time they lived on a 22-hr. day. On certain days urine samples were collected at frequent intervals to determine the pattern of excretion; on these days, activity, diet, and fluid intake were controlled as closely as possible. The eight subjects showed widely differing patterns of urine flow when living on the 22-hr. day. Most of them showed evidence of a persistent 24-hr. rhythm, though superimposed on it was an environmental (22-hr.) rhythm and a not inconsiderable amount of apparently random variation. One feature of the excretory pattern deserves special mention since it shows so clearly the existence of an underlying 24-hr. rhythm. Under normal living conditions any periods of marked diuresis which occur (urine flow greater than, say, 2.5 ml./min.) are most invariably restricted to the waking hours. Only one subject showed this same pattern of diuresis however, when living on the 22-hr. day. In fact, several members of the expedition suffered from frequent nocturnal diuresis; that is, diureses occurring during the first few hours after retiring to bed. These nocturnal diureses were far more frequent when the period of sleep coincided with day-time in Great Britain than when it coincided with night-time. For two of the eight subjects this same close correlation with the true time of day was also shown by periods of diuresis which they had during their waking hours. (Abstract quoted in part)

3087
Liapunov, B.
[SPACE STATION] Stantsiia vne zemli. — Znanie sila [no place], 1954 (9): 11-15. 1954. In Russian.
DLC (T4.Z5, v. 1954)

The construction of a space station is described and schematic illustrations are presented. The space station is equipped with an astronomic observatory and laboratory, a conservatory,

a helioinstallation reflector, living and service quarters, a radiolocator antenna, a lift, work shops (machine shops) and the helioinstallation house, a rocket mooring platform, radiotelescope antenna, another observatory, storage houses, turbogenerator and a boiler for the operation of the helioinstallation. Location of above items are numbered on the schematic drawing. Another schematic drawing is presented of a space station construction plan proposed by K. E. Tsiklovskii.

3088
Lillehei, J. P.,
S. S. Wilks, and E. T. Carter
CIRCULATORY RESPONSES OF NORMAL AND OF CO-ACCLIMATIZED DOGS DURING CO INHALATION. — Federation Proceedings, 13 (1I): 89. March 1954. DLC(QH301.F37, v. 13)

During inhalation of 0.4% CO in air for at least 30 min. (sufficient to produce over 50% carboxyhemoglobin), normal, Nembutal-anesthetized dogs showed: (1) a rise in pulse rate, respiratory rate, mean pulmonary arterial pressure, and cardiac output; (2) a relatively smaller rise in mean intrapleural pressure; and (3) little or no change in mean femoral arterial and left atrial pressure. Dogs which had been gradually acclimatized to breathing 0.1% CO in air 6-8 hours daily for over one year were found to have a significantly lower pulse and respiratory rate, a higher mean pulmonary arterial pressure, but approximately the same mean femoral arterial and intrapleural pressure as normal dogs. Measurements of the circulatory response of the CO-acclimatized dogs to CO inhalation are now in progress. (From the authors' summary)

3089
Lincoln, R. S., 1952
J. R. Simon, and T. W. DeCrow
THE EFFECTS OF PRACTICE UPON DIFFERENT COMPONENT MOVEMENTS IN VISUAL TRACKING. — Perceptual and Motor Skills Research Exchange, 4 (3-4): 123-131. Sept. and Dec. 1952. DNLM

An investigation was conducted to determine the effects of training and rate of target speed upon different component movements in direct tracking. A testing apparatus was utilized in which tracking was accomplished by following a rotating target cursor with another cursor connected to a hand wheel control. It was found that practice consistently reduced the frequency of occurrence of positioning errors. In the case of rate errors, however, there was little evidence of a consistent relationship between the number of errors and amount of practice. The only significant reduction in rate errors as a function of practice occurred with a slow target speed. Thus most of the learning effect was found in the positioning component of tracking error, indicating that learning effects do not appear as uniform phenomena in the component movements of tracking behavior. Some question is raised, therefore, as to the possibility of a generalized learning theory that could account for the specific aspects of performance in coordinated motion. Rather, the proper description of these results seems to require reference to intrinsic properties of the components and dimensions of response. (Authors' summary, modified)

3090
Lindbergh, C. A.
TRAINING FOR THE RECOGNITION OF OXYGEN EMERGENCIES IN HIGH-ALTITUDE FLYING. — In: (School Aviation Med.). Respiratory physiology in aviation, p. v-vii. Randolph Field, Tex. Sept. 1954. (Project no. 21-2301-0003). AD 49 179 PB121739

The importance of altitude-chamber training is emphasized and illustrated by examples from the author's own experience. The most important factors to consider are the following: to have the emergency equipment available and in useful condition, to use it in time

before consciousness is lost, and to have a plan how to use it.

3091
Lindenberg, R., and W. Noell 1952
[THE POSTMORTAL FORM OF THE ASTROCYTES AS A FUNCTION OF PREMORTAL, BIOELECTRICALLY CONTROLLED OXYGEN DEFICIENCY] Über die Abhängigkeit der postmortalen Gestalt der Astrocyten von praemortalem, bioelektrisch kontrolliertem Sauerstoffmangel. — Deutsche Zeitschrift für Nervenheilkunde (Berlin), 168 (6): 499-517. Oct. 1952. In German. DNLM

When death is instantaneous or preceded by anoxic anoxia of up to 30-min. duration, it is followed by an acute rapid swelling of the brain cells, which is soon superceded by a clasmatodendrosis with a total disintegration of the cells. The time at which clasmatodendrosis appears is dependent upon the temperature at which the brain is kept. Lower storage temperature retards and lengthens the process, but does not change it basically. Cellular disintegration can also be observed if death is preceded by anoxia of 30 to 60-min. duration, or when anoxia of longer duration is interrupted for a short time prior to death. The acute swelling stage frequently fails to take place, and, as a rule, the cells disintegrate into finer crumbs. Disintegration is slow at the same storage temperature as in the acute cases and is limited to the medulla. If death takes place after continuous subcritical exposures to oxygen lack (60 min. or more), the shape of astrocytes is preserved, even if the brain is stored unpreserved for 12 hrs. at 37°C. The cells remain of the same size or are slightly smaller, as if they had shrunk without loss of shape. (From the authors' summary, translated)

3092
Linderoth, A.
[AVERSION TO FLYING DURING TRAINING FOR BATTLE SERVICE] Flygolust hos elever under flygslagsgutbildung. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 3 (3): 11-12. 1954. In Swedish. DNLM

Fear of flying manifests itself in the following attitudes: (1) poor results during flight service in general, (2) poor results in special areas of flight service,(3) uneasiness in certain aspects of training, (4) attempts to avoid flying, and (5) generally pronounced aversion to flight. Preventative measures include examination by a psychiatrist to establish whether the fear originated in a specific incident (collision, landing, weather). However, very often it is a question of failing self-confidence, which can be resolved by positive reassurance on the part of the flight instructor. Poor results in a specific area of flight training may be averted by improving instruction methods. The desire to avoid flying may be counteracted to some extent by the use of drugs, although efficient guidance and good example will yield better results. Students who have a pronounced fear of flying or refuse to fly should be referred to a flight surgeon. In the case of pronounced reluctance to fly caused by accidents, no general rules can be given for coping with the problem. Stimulation of and increase in flying and ground-level activities, and strict discipline on the ground as well as in the air are still the most effective methods.

3093
Lindholm, A. 1953
BLOOD VOLUME AND TOTAL AMOUNT OF HEMOGLOBIN IN "HEATWORKERS." — Arbeitsphysiologie (Berlin), 15 (2): 99-102. 1953. In English. DNLM

The total amount of hemoglobin and the blood volume were determined in three groups of workmen in a steel mill at different degrees of heat exposure. The differences obtained in the total amount of hemoglobin or blood volume per kg. body weight

between the "heat workers' and "cold workers" were statistically insignificant. Average total amount of hemoglobin was 0.98% of body weight. The corresponding figure for blood volume was 64.8 cc./kg. body weight It is likely that an exposure to a hot environment does not increase the total amount of hemoglobin in well-trained individuals.

3094
Lindquist, S. E.,
W. D. Neff, and H. F. Schuknecht
STIMULATION DEAFNESS: A STUDY OF HEARING LOSSES RESULTING FROM EXPOSURE TO NOISE OR TO BLAST IMPULSES. — Jour. Compar. and Physiol. Psychol. 47 (5): 406-411. Oct. 1954. DLC (BF1.J57, v. 47)

In the cat, as in man, after exposure to wideband noise at high intensity or to explosive sounds such as produced by small arms fire, the frequency range for which hearing losses occur is centered around 4000 c.p.s. and extends one or two octaves above and below this frequency depending upon the degree of exposure. When the hearing loss is permanent and severe, degeneration of sensory cells in the upper basal and lower middle turns of the cochlea may be found upon post-mortem histological examination. When hearing losses are less severe (30 to 40 db. or less), clear damage to sensory elements in the cochlea cannot always be detected. Some disruption of supporting cells of the organ of Corti may occur and the hair cells may appear slightly distorted and less well defined than in the normal ear. Complete recovery of hearing may occur in the cat after losses as great as 80 db.; the time required for recovery is usually 48 hr. or less. Evidence suggests a considerable variability among animals in susceptibility to and recovery from temporary and permanent hearing losses produced by intense acoustic stimuli. Terms such as "boilermaker's deafness" and "aviator's notch" indicate that permanent hearing losses are common in occupations where repeated exposure to high noise level occurs. It is important to determine whether the losses are the result of repeated exposure to sounds at a "sub-damaging" level or of occasional exposure to peaks of sound, and what role is played by the factor of recovery between repeated exposures. Experiments with cats suggest that similar intracochlear changes underlie both reversible and irreversible hearing losses. (Authors' summary, modified).

3095
Lipkin, M.,
O. Bailey, and J. D. Hardy
THE EFFECT OF ULTRAVIOLET IRRADIATION UPON THE CUTANEOUS PAIN THRESHOLD. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5414, Oct. 22, 1954. iii+17 p. (Project Report no. NM 001 090.04.03). AD 46 270 UNCLASSIFIED

In order to further investigate relationships which may exist between the onset of cutaneous pain and tissue damage, measurements were made of pain threshold, degree of hyperalgesia, and onset and intensity of erythema during the development of burns caused by ultraviolet irradiation. It was found that the onset of erythema was associated with a fall in pain threshold. The maximum fall of pain threshold, the duration of this lowering, and the intensity of hyperalgesia and erythema increased with the ultraviolet radiation (intensity x time). It is shown that these experimental data are consistent with the hypothesis that, as a result of the ultraviolet irradiation, there is inhibition of some tissue repair processes, thereby causing a pain threshold lowering from roughly 45° C. to 36° C. In this state, even a slight (1° - 2° C.) elevation of skin temperature in a burn area evokes pain, and may be sufficient to cause thermal inactivation of cellular proteins at a rate great enough to result in tissue damage. (Authors' summary)

3096
Lipkin, M.,
and J. D. Hardy
MEASUREMENT OF SOME THERMAL PROPERTIES OF HUMAN TISSUES. — Univ. of Pennsylvania, Philadelphia (Contract Nonr-551(12)); and Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no NADC-MA-5405, April 7, 1954. iii+22p. (Project Report no. NM 001 090.04.01). AD 30 506 UNCLASSIFIED
Also published in: Jour. Applied Physiol., 7 (2): 212-217. Sept. 1954.
DLC (QP1.J72, v. 7)

With the use of a high-speed radiometer, measurements of the rapidly changing surface temperature of living human skin and excised human tissues have been made, when exposed to measured intensities of non-penetrating thermal radiation. From these data, the product of the thermal conductivity (k), the density (ρ), and the thermal capacity (c) was estimated for the tissues studied. This product, $k\rho c$, has the significance of an inertia, and was termed the "inertia for surface heating". Values of $k\rho c$ were determined for living skin, excised human fat, skin, muscle, and bone. The value of $k\rho c$ for the intact human skin increases several fold under slow heating. Evidence is presented which indicates that this increase in $k\rho c$ is the result of local passive dilatation of peripheral vessels in the skin area being heated. (Authors' summary)

3097
Lipkin, M.,
and H. L. Ratcliffe
SOME EFFECTS OF CYCLIC ACCELERATION IN RHESUS MONKEYS. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA 5404, May 4, 1954. iii+40 p. (Project Report no. NM 001 060 10.05) AD 36 626 UNCLASSIFIED
Also published in: Jour. Aviation Med., 25 (6): 594-599. Dec. 1954.
DLC (TL555.A1A4, v. 25)

The pathological results of rapid tumbling at high levels of acceleration upon rhesus monkeys (Macaca mulatta) are discussed. The centrifuge used was modified in such a manner that a turntable, capable of controlled rotation and separate from the centrifuge, was mounted at the end of the 8-foot arm. Eighteen of the monkeys were subjected to conditions which simulated those occurring when a pilot is forced to eject himself from a stricken aircraft. Acceleration forces varied from 25-35 g, and these were combined with rotations which ranged from 30-150 per minute. Three monkeys were used as controls. All of the animals were sacrificed within 1-6 hours after exposure. Damage which resulted was observed in the form of vascular congestion, edema and hemorrhage, formation of hyaline venous thrombi, and separation of parenchymal liver cells. The authors state that these changes are the result of forces beyond those of intravascular pressure increases due to acceleration, and they recommend that the possible implications with relation to man be studied further.

3098
Littell, E. T. 1952
FROSTBITE — Scient. American, 186 (2): 52-54; 56 Feb. 1952
DLC (T1.S5, v. 186)

Recent studies on the treatment of frostbite in high-altitude fliers by rapid thawing are reviewed, and the deleterious effects of some traditional remedies (i.e., treatment with snow or continued cold) noted. In addition, the physiopathological aspects of frostbite are discussed.

3099
Liu, C. 1952
PHYSIOLOGICAL AND NEURONAL CHANGES RESULTING FROM ANOXIA. [Abstract]. — Anat. Record, 112 (2): 423. Feb. 1952.
DLC (QL801.A45, v. 112)

Eleven guinea pigs were subjected to an atmosphere of nitrogen until the

following signs appeared: (1) hyperactivity, increased respiratory rate, and cyanosis of ears and lips; (2) loss of righting reflex with beginning apnea; and (3) apnea with spasm of facial muscles only. Then they were resuscitated. Within three minutes, recovery of heart beat and fibrilation of limb muscles occurred. The animals were killed at different intervals following resuscitation. No changes were observed in the spinal cords of animals sacrificed immediately after resuscitation. Animals which had survived 23-120 minutes, however, had many chromatolytic cells in the spinal cords. After a survival longer than two hours, the number of chromatolytic cells was diminished. Similar changes were seen in the brains for the survival period of 23-120 minutes, but without recovery after longer survival periods; there were also vascular changes apparently associated with neuronal changes seen after two hours. Atrophied, swollen, and shrunken cells were also observed.

3100
Lloyd, V. V. 1953
THE INTERACTION OF STIMULUS AREA AND INTENSITY AS CUES IN THE PERCEPTION OF DISTANCE. — Jour. Gen. Psychol., 49 (2): 167-183. Oct. 1953. DLC (BF1.J64, v. 49)

An apparatus and procedure are described for the investigation of the interaction of stimulus area and intensity as cues in the perception of distance. Where size discriminations are relatively easy, size constancy plays an important part in the judgment of distance and the effect of intensity is almost negligible. Where size discriminations are difficult, however, size constancy seems to be absent in this type of judgment and the role of intensity is greatly enhanced.

3101
Lockman, R. F.
AN ANALYSIS OF VARIANCE OF NAVCAD CLASSES ON THE MCT. — In: (Naval School Aviation Med.), Miscellaneous tests and minor evaluations, p. 36-38. Pensacola, Fla. April 20, 1954. (Project Report no. NM 001 058.25.11). AD 50 299(h) UNCLASSIFIED

An empirical test of the assumption that the sample class is a random sample of the population of Naval Aviation Cadets was made on a set of 6 classes for the Mechanical Comprehension Test (M.C.T.). M.C.T. scores were obtained for each member of the classes 41-52 through 46-52. Wilks' L_1 criterion test was applied to determine whether the class variances were homogeneous (Johnson, P. O., Statistical Methods in Research, Prentice-Hall, Inc., N. Y., 1949). The results indicated that any one of the 6 classes could have been used as a small representative sample of cadets as far as M.C.T. scores are concerned. (AD abstract)

3102
Lockman, R. F.
MULTIVARIATE STATISTICAL ANALYSES OF NAVAL AVIATION CADET SELECTION MEASURES. — Naval School of Aviation Medicine, Pensacola, Fla. Research Report no. NM 001 057.04.05, Nov. 8, 1954. iv+22 p. AD 41 983. UNCLASSIFIED

The purpose of this research was to investigate the multivariate discriminatory and predictive effectiveness of a naval aviation cadet selection battery with a one-year sample of 1685 selected cadets. A pass-attrite primary flight-training criterion was found to be statistically justified, since flight failures and voluntary withdrawals could not be discriminated by the generalized distance function technique. For criterion group membership, both the linear discriminant function and a multiple biserial prediction equation were equally effective. In general, predictable criterion variance existed for the selected cadets using the selection measures multivariately with the primary training pass-attrite criterion. The possible utilization of this variance for further selection and training purposes was discussed. (Author's abstract)

3103
Lockman, R. F.,
and A. C. Poe
A PROGRESS GRADE FOR NAVAL AIR TRAINING. — Naval School of Aviation Medicine, Pensacola, Fla. Project Report no. NM 001 058.17.02. Dec. 1, 1954. iv + 17 p. + Appendix. AD 73 949
UNCLASSIFIED

The multiple regression technique was modified to develop, at the end of the pre-flight phase of naval air training, a predictor of final over-all training grades for pass, fail, and resigned flight students. The modification of the regression technique was necessary because final over-all grades were not available for fail or resigned flight students. The results on the validation population indicated that the higher the progress grade the greater was the probability of completing flight training and for pass students the higher was the actual final over-all grade. The data on the cross-population showed similar results. External validity standards used on the cross-validation population substantiated these findings. This progress grade should be of operational use for improving the quality control of the naval air training and may be useful as an improvement on the pass-fail dichotomy ordinarily used as a flight training criterion. (Authors' abstract)

3104
Lockman, R. F
READABILITY VERSUS UNDERSTANDABILITY OF TEST INSTRUCTIONS. — In: (Naval School Aviation Med.), Miscellaneous tests and minor evaluations, p. 29-35. Pensacola, Fla. April 20, 1954. (Project Report no. NM 001 058.25.10). AD 50 299(g)
UNCLASSIFIED

Studies were conducted to determine how Flesch readability estimates compare with understandability ratings of the same test directions. Naval Aviation Cadets (129 to 273) were asked to check 1 of 7 designations indicating to what degree the test directions were understandable. The cadets rated each of 9 passages of test directions and instructions. On the 7-point descriptive scale, the material ranged in readability from fairly easy to difficult with the mode being average difficulty. A rank-order-correlation coefficient was calculated in order to quantify the relation between readability and understandability; the coefficient was -0.65. By using Olds' tables (Ann. Math. Statistics 9 (2): 133-149, 1938) with an n of 9 (passages) and a sum of squared differences of 198, the coefficient was significant at less than the 0.05 level. (From the AD abstract)

3105
Loeb, M.
A PRELIMINARY INVESTIGATION OF THE EFFECTS OF WHOLE-BODY VIBRATION AND NOISE. — Army Medical Research Lab., Fort Knox, Ky. Report no. 145, Nov. 12, 1954. 1+17+11 p. (AMRL Project no. 6-95-20-001). AD 47 142 UNCLASSIFIED

A number of psychomotor, sensory, and simple physiological tests were presented to 16 subjects before, during, and after control periods and periods of exposure to light vibration, heavy vibration, and noise. Among these tests were measures of mirror tracing performance, speed of tapping, different types of reaction time, manual steadiness, strength of grip, visual acuity, systolic and diastolic blood pressure, pulse rate, urine albumin, and urinary potassium excretion. Analysis of the data revealed temporal (practice or adaptation) effects for mirror tracing, pulse rate, and systolic blood pressure. No variation under control, noise, and vibration conditions occurred except in the cases of the visual acuity and manual steadiness measures. Tremor was relatively unchanged under light vibration and showed a significant increase under heavy vibration. A considerable but non-significant decrease appeared after both conditions of vibration. Noise had no apparent effect on steadiness. Visual acuity was impaired somewhat under light vibration and more under heavy vibration, but was not

apparently affected by noise. There were no observable after-effects. 34 references. (Author's summary)

3106
Loehning, R. W. 1953
V. Zapata-Ortiz, F. W. Hughes, and A. L. Tatum
EFFECTS OF COCAINE ON RATS SUBJECTED TO LOW TENSION OF ATMOSPHERIC OXYGEN. — Jour. Pharmacol. and Exper. Therapeutics, 108 (1): 80-86. May 1953.
DLC (RS1.J85, v. 108)

Rats ingesting food containing 100 or 200 mg./kg. of cocaine a day were gradually decompressed from sea level pressure to an altitude of 22,000 ft. A definite decrease in rate of growth was observed at altitude. While food consumption decreased with or without cocaine, the gain in weight was distinctly reduced in the animals comsuming the drug. This leads to the conclusion that another factor, not the dietary, is responsible for the weight loss. Also, when cocaine was administered, any kind of detectable effect was consistently of a deleterious nature in the anoxic animals.

3107
Lomonaco, T.
[EXPLOSIVE DECOMPRESSION IN HIGH-ALTITUDE FLIGHTS] La decompressione esplosiva nei voli in alta quota. — Rivista di medicina aeronautica (Roma), 17 (2-3): 196-206. April-Sept. 1954. In Italian, with English summary (p. 204).
DLC (TL555.A1R5, v. 17)
Also published in: Minerva medica (Torino), 45 (94): 1365-1367. Nov. 24, 1954. In Italian.

Results of investigations on the effects of explosive decompression on animals and man are reviewed. During explosive decompression, a marked increase takes place in thoracic and abdominal volume due to the sudden expansion of gases; at the same time, apnea and bradycardia are induced by vagus stimulation. Observations of animals sacrificed after decompression reveal hemorrhages in and congestions of almost all the organs. Large hemorrhagic zones are observed in the lungs, as well as atelectatic and emphysematous areas, while passive hyperemia is a characteristic symptom in the liver, spleen, and kidneys. Collapse or rupture of the alveolar walls and of numerous cell elements in the alveoli are frequent among the histologic findings. Tearing of myofibrillae in the heart and fissures of liver cells, are likewise symptomatic. All these traumatic changes may be attributed to the radical pressure changes acting on body cavities and liquids and to the effects provoked by the shock waves following explosive decompression.

3108
Lomonaco, T.
[THE EVOLUTION OF ITALIAN AERONAUTICAL MEDICAL THOUGHT DURING THE LAST TWENTY-FIVE YEARS] L'evoluzione del pensiero medico aeronautico italiano negli ultimi 25 anni. — Rivista di medicina aeronautica (Roma), 17 (2-3): 274-278. April-Sept. 1954. In Italian.
DLC (TL555.A1R5, v. 17)
English translation in: Jour. Aviation Med., 25 (5): 473-475. Oct. 1954.
DLC (TL555.A1A4, v. 25)

At the beginning of the present century, the Italian physiologist, Angelo Mosso, discovered the phenomenon of acapnia. His student, Amedeo Herlitzka, suggested the use of a mixture of oxygen with 7% carbon dioxide during flights at high altitude. Using such a mixture, Donati was able to reach an altitude of 14,000 meters in flight in 1933. The author has since determined that inhalation of pure oxygen is more effective in combating acapnia than the mixture utilized by Donati. Pure-oxygen inhalation permitted a pilot (Mario Pezzi) to reach an altitude of 17,000 meters in 1938 while enclosed in a hermetically sealed airplane compartment of the author's design. In 1933, Rodolfo Margaria discovered aeroembolism in pilots. In 1939, Giacobini

observed the emptying of the heart cavity in a rabbit under X-ray when exposed to +7 g. Endoscopic observations of caliber changes in the retinal artery during flight exposure to 4-5 g acceleration were made by Bietti and Scano in 1943. Observations were also made in the fields of hematology and psychology.

3109
Lomonaco, T.
[THE MUSCULAR WORK OF THE AIRPLANE PILOT DURING FLIGHT] Il lavoro muscolare del pilota d'aeroplano durante il volo. — Rivista di medicina aeronautica (Roma), 17 (4): 408-411. Oct.-Dec. 1954. In Italian, with English summary (p. 411).
DLC (TL555.A1R5, v. 17)

Changes in the pilot's muscular-work performance in flight affect the following physiological functions: (1) respiration, especially at high altitudes; (2) energy output; and (3) muscular efficiency at various altitudes. An estimate is made of the amount of food necessary to be carried along on a particular flight and the quantity of oxygen required to prevent respiratory changes due to deterioration of muscular performance or to anoxia. Values were determined for muscular work (expressed in kg./min.) as applicable to the following tasks: (1) landing (-49); (2) take off (-46); (3) turning (-40); and (4) cruising (-23). In a normal flight of about 70 minutes, muscular work was found to amount to about 1815 kg., which equals an energy expenditure of about 21.3 cal. For more severe conditions of flight, a figure twice as large is suggested. The working capacity was found to decrease with increasing altitude. Muscular work and lack of oxygen were found to cause an increase in the frequency of breathing.

3110
Lomonaco, T.
[WHAT IS THE MAXIMUM AGE LIMIT FOR A PILOT OF MODERN MILITARY JET PLANES? PSYCHO-PHYSIOLOGICAL CONSIDERATIONS] Qual'è il limite massimo di età di un pilota di moderno velivolo militare a reazione? Considerazioni psico-fisiologiche. — Rivista aeronautica (Roma), 30 (12): 1319-1332. Dec. 1954. In Italian.
DLC (TL504.R54, v. 30)

Complete physiological and psychological efficiency of the pilot are necessary requirements for attaining good resistance to the stresses of jet flight, which often change under extraphysiological conditions. The phenomenon of aging causes decreased psycho-physiological activity and is not suitable for modern flight. Maximum age limits for optimum pilot performance are between 35-37 years of age. These age limits are derived from a detailed anatomical and functional analysis of the various organ systems of each pilot, since it is noted that chronological age does not always coincide with physiological age.

3111
Long, E. R., 1953
and W. A. Lee
THE INFLUENCE OF SPECIFIC STIMULUS CUING ON LOCATION RESPONSES. — Univ. of Virginia, Charlottesville, (Contract W33(038)-ac-21269); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-314, Dec. 1953. iv + 14 p. (RDO no. 694-37) AD 34 520 PB 119 017

The present study is the third in a series of laboratory investigations designed to explore the concept of set and its applicability to the perception of stimuli against background "clutter". Both location and identification of stimuli have been investigated in earlier studies. The present experiment sought to learn whether and under what conditions stimulus location would be benefited by providing the observer with setting cues relative to the shape or contour of the critical stimulus figure to be detected, without any spatial location cuing. The obtained results indicate that figural contour cuing alone can increase the accuracy of stimulus

location, but only under very limited conditions, specifically, (1) only when the setting information is given before stimulus presentation, (2) when both stimulus and confusion figures are undistorted, and (3) when the degree of response restriction produced by the setting cues is very specific, possibly limited to a single figure. (Authors' abstract)

3112

Long, E. R., 1953
and W. A. Lee

THE ROLE OF SPATIAL CUING AS A RESPONSE-LIMITER FOR LOCATION RESPONSES. — Univ. of Virginia, Charlottesville (Contract W33(038)-ac-21269); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-312, Dec. 1953. (RDO no. 694-37). AD 34 516 PB 129 578

The research reported herein constitutes the second of a series of laboratory investigations of the nature of perceptual set and its possible application to the process of data assimilation by the human operator. Previous experiments involved the location and identification of geometrical figures appearing in a field of "clutter" composed of other distorted geometrical figures. In the present study it was sought to learn if clutter composed only of undistorted figures would lead to perceptual error, and if so whether areal cuing (spatial restriction) alone would increase accuracy of stimulus location. Two levels of clutter were employed, and setting information was presented in two temporal positions, specifically, (1) both before and after stimulus presentation, and (2) only after stimulus presentation. The results indicated that location uncertainty can be produced by clutter, independently from figural contour distortion, and that this uncertainty can be reduced by areal cuing alone. The beneficial effects of areal cuing increase with increasing amounts of clutter or response uncertainty. Differential effects of the two temporal positions of setting were found. This finding was interpreted as evidence that setting can restrict more than one response in the perceptual process. (Authors' abstract)

3113

Long, E. R., 1953
R. H. Henneman, and L. S. Reid

THEORETICAL CONSIDERATIONS AND EXPLORATORY INVESTIGATION OF "SET" AS RESPONSE RESTRICTION. — Univ. of Virginia, Charlottesville (Contract W33(038)-ac-21269); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-311, Dec. 1953. (RDO no. 694-37). AD 34 517 PB 129 579

An analysis of message reception in the process of communication suggests that the various perceptual stimuli composing the messages lead to sequences or chains of discriminatory responses. Stimulus ambiguity from various sources (e g., distortion, impoverishment, or clutter) gives rise to response uncertainty on the part of the operator, hence to errors of behavior One method of combatting these response errors is believed to be by means of establishing "sets" or expectancies for certain responses rather than others. "Set", defined as a response restrictor, should improve message reception by increasing the probability of others. An initial exploratory experiment called for the manipulation of three variables in a complex perceptual task requiring the subjects to locate and identify single distorted geometrical figures which had been added to a 64-cell square matrix already containing 16 other distorted geometrical figures as "clutter". The variables were: (1) type of setting or response limitation (i.e., areal, or figural cuing); (2) degree of setting or restriction; and (3) type and position in the behavior sequence of the response limited. The results indicated that

setting information designed to restrict locating responses significantly aided stimulus location, while both location and identification response restriction contributed to increased accuracy of stimulus identification. The effects of these two types of setting operations were independent, the only evidence for any kind of interaction being the finding that correct identification was contingent upon a prior correct location. This last finding supports the assumption of response chaining. (Authors' abstract)

3114
Long, E. R.,
L. S. Reid, and W. D. Garvey
THE ROLE OF STIMULUS AMBIGUITY AND DEGREE OF RESPONSE RESTRICTION IN THE RECOGNITION OF DISTORTED LETTER PATTERNS. — Univ. of Virginia, Charlottesville (Contract W33-038-ac-21269); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-147, May 1954. iv + 18 p. (RDO no. 694-37). AD 48 906
PB 129 576

The present study, fourth in a series designed to explore the basic operation of perceptual "set" as response restriction, sought to broaden the generalization derived from the earlier experiments. New stimulus material was employed, letters of the alphabet rendered ambiguous by contour distortion. The subject's task was to identify single distorted letters. Three variables were investigated: (1) degree of response restriction; (2) level of stimulus distortion, hence response uncertainty; (3) temporal position of the cuing information (response restriction) relative to presentation of the ambiguous stimulus. The response restricting operations significantly increased the number of identifications, the helpful effect increasing with increased degree of restriction. Degree of restriction and level of stimulus distortion (response uncertainty) proved to be independent. Post-stimulus setting was significantly better than pre-stimulus setting for the stimulus identification entailed in this study. This finding agrees with those of previous studies, in which indentification responses were more effectively restricted by post-stimulus setting. (Authors' abstract)

3115
Longo, V. G.,
and L. Napolitano
[PHARMACOLOGY OF THE VESTIBULO-OCULAR REFLEX. PART III: ACTION OF ORTHO-TOLUOLOXY-PROPANEDIOL (MEPHENESIN), MORPHINE, ESERINE AND DFP ON POSTROTATORY NYSTAGMUS OF RABBITS AFTER EXTIRPATION OF THE TELENCEPHALON] Farmacologia del riflesso vestibolo-oculare. Nota III: Azione dell'ortotoluolossipropandiolo (Mephenesin), della morfina, della eserina e del DFP sul nistagmo postrotatorio nel coniglio dopo asportazione del telencefalo. — Archives internationales de pharmacodynamie et de thérapie (Gand, Bruxelles), 99 (2): 215-223. Sept. 15, 1954. In Italian, with English summary (p. 222). DNLM

Rabbits with the telencephalon removed were given drugs which are known to inhibit or facilitate the ocular response to rotatory stimulation in the intact animal. No influence was shown on the inhibitive action of ortho-toluolpropanediol nor on the facilitative action of physostigmine and diisopropylfluorophosphate (DFP). The inhibiting action of morphine was increased by suppression of the cortex. The relative independence of the higher centers, at least with respect to these inhibiting and facilitating actions, indicates a direct action on the vestibulo-ocular reflex arc, or an indirect one via the subcortical and mesencephalic centers. (Authors' summary, modified)

3116
Loring, J. C. G. 1953
SELECTED BIBLIOGRAPHY ON THE EFFECTS OF HIGH-INTENSITY NOISE

ON MAN. — Jour. Speech and Hearing Disorders, Monograph Supplement no. 3. 38 p. 1953. DNLM

Also issued by Psycho-Acoustic Lab., Harvard University, Cambridge, Mass. (Report no. PNR-140, Contract N5ori-76, T.O.2). Jan. 1954. AD 40 110.

A bibliography is presented including 741 references on the effects of high-intensity noise on man. Special consideration is given to the following topics: the deafening effects of noise; effects on communications; aural protective devices and preventive measures; effects on human behavior; physiological effects; measurement and reduction of noise, suggested standards for noise control; noise fields from engines, including jet engines; and general references on noise, reference works, medico-legal aspects, and those not otherwise classified.

3117
Lothridge, C. D. 1953
STEREOSCOPIC SETTINGS AS FUNCTIONS OF VERTICAL DISPARITY AND TARGET DECLINATION. — Jour. Gen. Psychol., 49 (2): 241-260. Oct. 1953. DLC (BF1.J64, v. 49)

The effect of the introduction of vertical disparity and target declination on steroscopic settings was investigated. The dependent variable was measured in terms of the average and the variability of the settings made by the subject. The independent variable, vertical disparity, is defined as a difference in the distance between the target and fiducial mark for the views presented to the right and left eyes. Target declination is defined as rotation of the target from the vertical position in the frontal plane. The author draws the following conclusions: (1) Mean settings do not change systematically with vertical disparity. (2) As the amount of vertical disparity increases, the precision of stereoscopic settings tends to decrease, as shown by an increase in variability. (3) For a given vertical disparity, an increase in target declination up to 60° decreases the precision of stereoscopic settings, as shown by an increase in variability. (4) For the horizontal target (90° target declination) variability decreases below that for the 30° and 60° declinations when 11.5 minutes of vertical disparity is introduced; and at maximum disparity, 19.2 minutes, variability is between that found for the 30° and 60° declinations. (5) When the distance factor was investigated with the vertical target, it was found that there was a decrease in precision when the distances between target and fiducial mark which approximated those used with the horizontal target were used.

3118
Loveless, N. E.
MANUAL TRACKING IN THE FOUR QUADRANTS OF A CIRCULAR SCALE. III. LEFT AND RIGHT QUADRANTS. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 886, July 1954. 13 p. AD 43 010 UNCLASSIFIED

In a compensatory tracking task on a circular scale, operators were required to manipulate a circular control knob, which was placed vertically below the scale, so as to maintain the pointer on an intermittently disturbed target. The targets were the left-hand and right-hand cardinal points of the scale. Two display-control connections were used: (1) direct-drive in which a clockwise rotation of the control knob caused a clockwise rotation of the pointer; and (2) reversed drive in which a clockwise rotation of the control knob caused the pointer to rotate in a counterclockwise direction. The direct drive produced greater speed and accuracy. When direct drive is used, the target should be in the top or left-hand quadrant. No difference exists between the bottom and right-hand quadrants, but performance on the latter may show less deterioration under stress. If reversed drive is used, the position of the target does not affect speed and accuracy of response. (AD abstract)

3119
Lovell, G.
DESIGN AND DEVELOPMENT OF THE R.A.E. DUMMY OF THE STANDARD AIRMAN. — Royal Aircraft Establishment (Gt. Brit.), Farnborough. Technical Note no. Mech. Eng. 176, May 1954. 14 p., 13 plates. AD 38 849
UNCLASSIFIED

A dummy of the standard airman has been developed at the R.A F. for use in dynamic and static tests. It has been designed to the dimensions of the average airman and the limbs and the complete man have approximately the correct weight and centers of gravity. Its all up weight (fully clothed, with ballast) is normally 166 lb. but it can be varied from this figure if desired. The dummy has a basic metal structure, covered with foam rubber and articulated at the joints. While it is normally fitted with a simple canvas suit, it can be dressed in standard aircrew clothing, equipment, and headgear. There are cavities for instruments in the head and in the upper and lower trunks. A box containing three mechanical accelerometers mutually at right angles can be fitted in each of these cavities. (Author's summary)

3120
(Lowell Observ.) 1952
THE STUDY OF PLANETARY ATMOSPHERES. — Lowell Observatory, Flagstaff, Ariz. (Contract AF 19(122)-162); issued by Geophysical Research Division, Air Force Cambridge Research Center, Cambridge, Mass. Final Report, Sept. 30, 1952. v + 290 p. AD 10 609 UNCLASSIFIED

See item no. 3457.

3121
Lowenstein, O., 1952
and I. E. Loewenfeld
DISINTEGRATION OF CENTRAL AUTONOMIC REGULATION DURING FATIGUE AND ITS REINTEGRATION BY PSYCHOSENSORY CONTROLLING MECHANISMS. II. REINTEGRATION: PUPILLOGRAPHIC STUDIES. — Jour. Nervous and Mental Diseases, 115 (2): 121-145. Feb. 1952.
DLC (RC321.J83, v. 115)

The "psychosensory restitution phenomenon" is essentially the sudden or gradual restitution to normal of a reflex previously exhausted by repeated stimulation, upon interposition of a sensory or psychologic stimulus of a different origin. A study of a series of experiments exploring the psychosensory restitution in pupillary light reflex activity of man (rested and in the state of general fatigue) and various animals led to the formulation of certain general and specific laws regarding the locus and interaction of psychosensory restitution mechanisms and fatigue. It was concluded that sensations of fatigue have a physiological function of rhythmically shifting the sympathetic-parasympathetic equilibrium in favor of the sympathetic, recurrently reintegrating the autonomous mechanisms of control, defatiguing the individual, and delaying total exhaustion culminating in sleep or interruption of the activity.

3122
Lowry, R. H.,
and W. H. Johnson
"PSEUDO MOTION SICKNESS" DUE TO SUDDEN NEGATIVE "G": ITS RELATION TO "AIRSICKNESS". — Jour. Aviation Med., 25 (2): 103-106. April 1954. DLC (TL555.A1A4, v. 25)

It is suggested that there are probably two types of airsickness. "True" airsickness which is due to stimulation of the nonauditory membranous fibers of the inner ear and is caused by aerobatics and rough air. "Pseudo" airsickness is induced by aerobatics involving sudden negative g; the forces acting from feet to head cause displacement of gastric contents against the cardiac orifice of the stomach, anti-peristalsis is set up in the esophagus, and projectile vomiting occurs without nausea. This second type of sickness is the type which is described here. Dogs and monkeys under light

nembutal anesthesia were subjected to a sudden -5 g, or more, on a human centrifuge (maximum g was reached in a five-second period). X-ray serial pictures were taken at intervals of one-half second, which showed the displacement of a barium meal from the stomach into the esophagus. Some of the food was occasionally inhaled into the larynx. Cessation of the negative g force resulted in the food bolus returning to the stomach.

3123
Luchins, A. S.
THE RELATION OF SIZE OF LIGHT TO AUTOKINETIC EFFECT. — Jour. Psychol., 38 (2): 439-452. July-Oct. 1954. DLC (BF1.J67, v. 38)

Exploratory experiments were carried out on 50 subjects to study the relationship between autokinetic movement (apparent movement of a stationary light) and the size of the light in a dark room. The light source was held constant but the size of the stimulus was varied by using slides with different size openings. A positive relationship was found between size and latency (the time elapsed before the movement was reported). An inverse relationship between size and frequency of reported movements could be established. Furthermore, there was a tendency to report smaller movements for larger light stimuli. Forward-backward movements were reported first and perceived as more prevalent for larger light stimuli.

3124
Ludvigh, E. 1952
CONTROL OF OCULAR MOVEMENTS AND VISUAL INTERPRETATION OF ENVIRONMENT. — A. M. A. Arch. Ophthalmol., 48 (4): 442-448. Oct. 1952. DLC (RE1.A62, v. 48)

A hypothesis is presented that, in the absence of articular sensitivity and with exteroceptive feedback from the retina ineffective for the provision of an error signal, the ocular movements of fixation and pursuit are controlled to a substantial extent by parametric feedback from the extraocular muscles. The hypothesis is applied in the qualitative explanation of various normal and abnormal ocular movements and the accompanying perception of movement, or lack thereof, of the eyes and the environment. (Author's summary)

3125
Ludvigh, E.,
and J. W. Miller
AN ANALYSIS OF DYNAMIC VISUAL ACUITY IN A POPULATION OF 200 NAVAL AVIATION CADETS. — Kresge Eye Inst., Detroit, Mich. (Contract Nonr-586(00)); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 075.01.07). Joint Project Report no. 3, Dec. 22, 1954. ii+18p. AD 61 455
UNCLASSIFIED

It had been shown previously that visual acuity deteriorates as the angular velocity of the test object, relative to the observer's eye, is increased. The results of testing the dynamic visual acuity of 200 naval aviation cadets are presented, and some aspects of the data are analyzed. The variables examined are the thresholds determined at 20°/sec. and 110°/sec. and the $\underline{a}$ and $\underline{b}$ parameters of the empirical equation $\underline{y} = \underline{a} + \underline{bx}^3$ relating visual acuity to the angular velocity of the test object. The distributions of all the variables are found to be abnormal, and the various possible causes for the lack of normality are considered. It is suggested that the neural mechanisms underlying static and dynamic visual acuity may be different. (Authors' abstract)

3126
Ludvigh, E.,
and J. W. Miller
SOME EFFECTS OF TRAINING ON DYNAMIC VISUAL ACUITY. — Kresge Eye Inst., Detroit, Mich. (Contract Nonr-586(00)); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 075.01.06).

Joint Project Report no. 6, Sept. 22, 1954. 12 p. AD 51 865

UNCLASSIFIED

An investigation has been made of the effect of training on the dynamic visual acuity of 200 Naval Aviation Cadets. It was found that the effect of training was substantial at a high velocity of test object, regardless of whether improvement is expressed in absolute or in percentage terms. At 110°/sec. the amount of improvement in dynamic visual acuity with training, the "ultimate" threshold, and the rate of improvement were all found to vary greatly among individuals. The thresholds of the twenty subjects having the highest thresholds were compared with the twenty subjects having the lowest threshold values. A significant difference was found to exist at trial one and similarly at all trials thereafter. (Authors' abstract)

3127

Luft, U. C.

PHYSIOLOGICAL ASPECTS OF PRESSURE CABINS AND RAPID DECOMPRESSION. — In: (School Aviation Med.), Respiratory physiology in aviation, p. 129-142. Randolph Field, Tex. Sept. 1954. (Project no. 21-2301-0003). AD 49 179 PB 121 739

Principles involved in the physiological requirements of flight in a pressurized aircraft are analyzed: In pressure cabins at ambient air the altitude threshold without any danger of hypoxia is between 8000-10,000 ft. and 39,000 ft. when inhaling air and O_2; above 43,000 ft. pure O_2 is inhaled, and pressure must be applied to the entire body. Symptoms of decompression sickness seldom become incapacitating below 30,000 ft. Pressure control in the cabins may be carried out either by continuous evaporation of liquid O_2 and N_2 or by use of mechanical superchargers continuously moving ambient air into the compartment. Sudden exposure to low ambient pressure does not affect solids and fluids in the body; the distension of gases, however, in the body cavities especially, may cause discomfort. Furthermore, if the airways are closed at the moment of decompression, the pulmonary gases expand, and pulmonary tissues may be ruptured. Alveolar gas samples taken at 50,000 ft. showed that the lung contained 40% CO_2, 28% O_2, and about 30% N_2, thus reversing the normal diffusion gradient prevailing at sea level. Under normal conditions the O_2 tension in mixed venous blood is between 35 and 40 mm. Hg. In rapid decompression this level is reached in the lungs at 33,000 ft. Above 53,000 ft. the time of "useful consciousness" is equal whether oxygen equipment is used or not (about 6 seconds).

3128

Lundgren, C. 1953

ALVEOLAR OXYGEN CONCENTRATION DURING OXYGEN ADMINISTRATION IN HEALTHY AND HYPOXEMIC SUBJECTS. — Acta physiologica scandinavica (Lund), 30, Supplement 111, p. 144-147. 1953. DNLM

Comparisons between the alveolar oxygen concentrations of normal and hypoxemic subjects treated with oxygen by nasal catheter show that in the latter group considerably lower concentrations are attained than in the former one. One reason for this difference is that some subjects breathe partially through the mouth. (From the author's summary)

3129

Lundgren, N. P. V., E. [H.] Roorbach, A. Lindholm, D. Hudson, W. M. Boothby, and C. S. White

HUMAN TOLERANCE TO ACUTE EXPOSURE TO CARBON DIOXIDE: RESPIRATORY RESPONSE TO OXYGEN AND 4.1 AND 6.2 PERCENT CARBON DIOXIDE IN AIR AND OXYGEN AT A GROUND LEVEL OF 5,000 FEET. — Lovelace Foundation for Medical Education and Research, Albuquerque, New Mexico (Contract AF 33(038)-13244); issued by School of Aviation Medicine, Randolph Field, Tex. July

1954. 13 p. (Project no. 21-1402-0001, Report no. 3). AD 115 448 PB 115 448

Subjects acclimatized to a ground level of 5,000 feet showed a transient decrease in expiratory minute volume and a temporary elevation of the alveolar pCO_2 after shifting from air to oxygen breathing. Shifting from inhaling air to inhaling 4.1 and 6.2 percent CO_2 in air (20.3 to 21.0 percent O_2) and in oxygen (95.7 and 93.5 percent O_2) elevated the tidal and expiratory minute volume, the alvolar pCO_2, and the respiratory rate. The increase in expiratory minute volume was accounted for more by an increase in tidal volume than by an increase in respiratory rate. In experiments with 4.1 percent CO_2 immediate differences were noted between the air and oxygen groups. These were transitory. In contrast, the experiments involving 6.2 percent CO_2 showed a larger difference between the air and oxygen groups which persisted throughout the 10-minute period of inhaling CO_2. The expiratory minute volumes were higher in the air than in the oxygen group and the difference was accounted for by a difference in respiratory rate rather than in tidal volume. The results were discussed and were not inconsistent with the hypothesis that an acidosis increased the sensitivity of the respiratory mechanism to hypoxia. (Authors' abstract)

3130
Lundin, G. 1953
NITROGEN ELIMINATION DURING OXYGEN BREATHING. — Acta physiologica scandinavica (Lund), 30 (Suppl. 111): 130-143. 1953. In English. DNLM

Nitrogen elimination during oxygen breathing from a closed spirometer system was measured in 4 male and 3 female subjects between 16 and 42 years old. Graphic treatment of the results yielded an elimination curve with three exponential fractions: a rapid fraction with time constant (fractions eliminated per min.) between 0.41 and 0.55, representing nitrogen from highly perfused tissues; a slower (0.053-0.060) muscle fraction; and a slow (0.0036-0.0068) component consisting of nitrogen mainly from fat. The volume of nitrogen from the first fraction varied between individuals according to size, but also in the same subject because of variations in the efficiency to rinse out the lung nitrogen in 5 deep breaths. The muscle fraction was constant as to amount in the same subject, and the elimination rate was about the same in all subjects, indicating that the resting blood flow in the musculature of young people (16 years) is about the same as in older people (42 years). The volume of the third slow fraction varied with the estimated fat content of the subjects. However, in the same subjects there were variations both in volume and elimination rates, attributed to an inclusion of intestinal gases of various amounts in this third fraction. No clear relationship was found between age, fat content, and rate of nitrogen elimination in the last fraction.

3131
Luria, L. 1953
[ACCLIMATIZATION IN HIGH MOUNTAIN AND SIGNIFICANCE OF PULSE AND PRESSURE VALUES IN VARIOUS BODY POSITIONS] L'acclimatazione in alta montagna e il significato dei valori del polso e della pressione nelle diverse posizioni del corpo. — Atti del. V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 307-310. In Italian, with English summary (p. 310) DNLM (W3.C0943a)

Pulse rate measurements in persons living at an altitude of 4,560 meters on Monte Rosa demonstrated (1) variations in acclimatized subjects (25-40 years of age) in both horizontal and vertical positions; (2) an increased rate in normal nonacclimatized subjects (21-61 years of age) in the vertical position, and (3) a reduced rate in non-acclimatized subjects with altitude sickness (20-51 years of age) in both vertical and horizontal positions.

These findings may serve as an index of acclimatization. Arterial blood pressure in vertical and horizontal positions was not significantly altered in acclimatized and normal non-acclimatized persons. Systolic pressure was not altered in older subjects in the vertical position, but a 5-10 mm. Hg decrease was noted in the younger ones.

3132
Lybrand, W. A.,
T. G. Andrews, and S. Ross
SYSTEMIC FATIGUE AND PERCEPTUAL ORGANIZATION. — Amer. Jour. Psychol., 67 (4): 704-707. Dec. 1954.
DLC (BF1.A5, v. 67)

An experiment was carried out on 48 subjects subjected to conditions of sleep deprivation in which the following perceptual tasks were related to fatigue in a systematic manner. (1) Perception of Hidden Figures, (2) Müller-Lyer Illusion, (3) Kohs Block Designs, (4) Primary Mental Abilities (Space Battery), (5) Size Constancy, (6) Shape Constancy, and (7) Perception of the Upright. On the whole, results were inconclusive. However, there was a strong suggestion that perceptual organization is more efficient after mild physical activity and less efficient after sleep deprivation. The former is supposed to be a function of increases in perceptual vigilance produced by work as a warming-up condition. Severe exercise might be expected to induce a decrement in performance. The authors conclude that perceptual organization is a behavioral category which is sensitive to variations in conditions assumed to induce general systemic fatigue. The changes also seem to be in accord with variations in physiological conditions which occur under these conditions.

3133
Maag, C H
A CONCEPTUAL REASONING TEST FOR USE IN STUDIES OF HYPOXIA. — Naval School of Aviation Medicine, Pensacola, Fla. Sept. 29, 1954. 17 + iii p. (Project Report no. NM 001 059.35. 01). AD 50 298 UNCLASSIFIED

A conceptual reasoning test was designed for use in studying performance decrement under conditions of hypoxia. The problem involved the selection of a given number of wooden blocks having two characteristics in common with a model block. The subject made his choices from a total of 32 blocks which had various combinations of the following 5 dichotomous characteristics: large or small, tall or short, round or square, hollow or solid, and numbered or lettered. A progressive increase in the mean time per problem and in the standard deviation accompanied an increase in the degree of hypoxic stress (exposure to simulated altitudes of 13,000 to 18,000 ft). The conceptual reasoning test was sufficiently sensitive to permit evaluation of differences in performance at various altitudes and also to plot individual variation as a function of increasing duration at the same altitude. (AD abstract)

3134
Maag, C. H.
AN EVALUATION OF CONCEPTUAL THOUGHT UNDER CONDITIONS OF OXYGEN DEPRIVATION. — (Thesis, Univ. Florida, Gainesville). Ann Arbor, Mich.: University Microfilms, June 7, 1954. vii + 112 + [2] p.
DLC (Microfilm AC-1, no. 9552)

Impairment in behavior under hypoxic stress was investigated in 10 male subjects, 18-20 years of age, in a decompression chamber at the following altitudes: 13,000 ft., 16,000 ft., sea level - 150 ft., 18,000 ft., and 17,000 ft. A sensitive test, the Conceptual Reasoning Test, was devised to measure complex conceptual performance, and was validated in preliminary pretraining sessions. The subject was asked to select a certain number of blocks from 32 blocks having five dichotomous characteristics in common with a given model. All subjects worked to the verge of collapse or until the end of the session. It was concluded, that (1) there is

a significant decrement in conceptual reasoning in hypoxia, which increases with the degree of stress, as shown by an increase in mean time and variability of responses; (2) blocking phenomena, defined for the purposes of this experiment as responses exceeding the subject's mean pre-training performance time by +3.09 S.D., tend to increase in frequency with the degree and duration of hypoxia. Major inter- and intra-individual differences in the pattern of behavioral disorganization prior to collapse were observed. The author concludes that deterioration in efficiency of performance under hypoxic stress is saltatory, in that there is an initial decline followed by periods of lowered efficiency (blocks) alternating with periods of normal efficiency until collapse. (58 references)

3135
Maag, C. H.,
and A. L. Hall
EXPLORATORY INVESTIGATION OF THE EFFECT OF EXPLOSIVE DECOMPRESSION UPON LEARNED RESPONSES IN THE WHITE RAT. — In: (Naval School Aviation Med), Miscellaneous tests and minor evaluations, p. 30-32. Pensacola Fla. Oct. 20, 1954. (Project Report no. NM 001 058. 25. 24). AD 55 782(f) UNCLASSIFIED

One group of 8 rats was taught a simple turning response in a water T-maze, while a second group was trained to make a black-white discrimination response in the maze. After being subjected to explosive decompression at a magnitude of 0 to 60,000 ft. in 0.094 second, the rats were retested for learning retention. Both groups demonstrated a level of proficiency equal to that displayed prior to explosive decompression. No apparent decrement in the learned response resulted from the explosive decompression. Postmortem histological studies revealed some respiratory and visceral tissue damage but no indication of cerebral involvement. (AD abstract)

3136
McCleary, R. A.,
and R. H. Johnson
PSYCHOPHYSIOLOGICAL EFFECTS OF COLD. II. THE ROLE OF ALCOHOL INGESTION AND COMPLEXION IN MANUAL PERFORMANCE DECREMENT. — School of Aviation Medicine, Randolph Field, Tex. March 1954. iii+ 9 p. (Project no. 21-1202-0004, Report no. 2.). AD 30 033 PB 114 116

Sixty-four subjects were timed on a manual-performance test at four different ambient temperatures (0°, -10°, -20°, and -40° F.) after the ingestion of of 60 cc. of 40% (by volume) alcohol. About half the group were blonds and half were brunets. At -40° F., the ingested alchohol resulted in significantly less time being spent in "warming up" while completing the manual task. The "working time" required to complete the task was also significantly influenced at -40° F. Differences in complexion were not reflected in performance scores. The hypothesis arises that people differ as to whether it is the sensory or motor effects of the cold on the hands that is most responsible for work decrement under conditions of low ambient temperature. (School of Aviation Medicine abstract)

3137
McDonald, I. R , 1953
D. A. Coats, and J. Munro
THE RENAL REGULATION OF THE EXTRACELLULAR IONIC PATTERN DURING HYPERVENTILATION. — Australian Jour. Exper. Biol. and Med. Sci. (Adelaide), 31 (5): 425-439. Oct. 1953. DLC (QH301.A8, v. 31)

Hyperventilation in human subjects was produced by passive respiration for a period of three to four hours. This caused the blood pH to rise, the extracellular bicarbonate concentration to fall, and the extracellular chloride concentration to rise both absolutely and in relation to the total cation concentration. The urinary pH rose and the renal excretion of Na^+, K^+, Cl^- and HCO_3^- altered so that the ratio Cl/Na+K

fell and the ratio $HCO_3/Na+K$ rose. These changes were related to the change in blood pH (or pCO_2) and were such as would restore the extracellular H_2CO_3: $BHCO_3$ ratio to normal. There was no correlation between changes in renal excretion rates of water and individual electrolytes and the blood pH (or pCO_2). A redistribution of water and electrolytes occurred in the body fluids. (Authors' summary)

3138
McFarland, R. A.
PSYCHO - PHYSIOLOGICAL PROBLEMS OF AGING IN AIR TRANSPORT PILOTS. — Jour. Aviation Med., 25 (3): 210-220. June 1954.
DLC (TL555.A1A4, v. 25)

Airline pilots, as an occupational group, are younger than the average of employed men in the U S., but the increase in the number of pilots above 40 has indicated the necessity for additional knowledge concerning the older pilot. This study indicates that while older pilots react less adequately to stress than younger pilots, the problem of physical stress to the pilot groups is relatively unimportant. Acuity in hearing and sight diminish with age, but the conditions under which a pilot functions (constant flight and motor noises, great lighting contrasts) renders slight impairment of these senses a minor consideration. Speed and skill of motor functions also decline with years; however, the most significant aging problem is concerned with a gradual loss of mental agility respective to remembering and problem solving.

3139
McGrath, S. D.,
E. D. Wittkower, and R A Cleghorn
SOME OBSERVATIONS ON AIRCREW FATIGUE IN THE RCAF-TOKYO AIRLIFT. — Jour. Aviation Med , 25 (1): 23-37. Feb. 1954.
DLC (TL555.A1A4, v. 25)

The authors have investigated the condition known as "transient fatigue"; subjects were air crews operating on the RCAF Tokyo airlift and flying approximately 100 hours per month. The chief symptoms of the fatigue state were: irritability, sleepiness, lowered performance standards, and delayed reaction time. There are three main groups of factors associated with "transient fatigue": (1) factors common to transport flying in general, such as lengthy flights, delayed flights, false starts, and numerous details prior to take-off; (2) factors related directly to the particular squadron under discussion concerned minor faults of the DC-6 (the high noise and vibration levels, inadequate heating system, poor design of the flight deck, faulty arrangement of instruments, poor cockpit lighting); (3) factors of a personal nature were inexperience, personality conflicts, domestic worries. The above information was collected from 9 group discussions, 55 personal interviews, and 78 questionnaires. The authors advise remedial measures for the physical and subjective sources of strain and recommend psychiatric council for the resultant stresses.

3140
McKenzie, M. E.
CAREER DEVELOPMENT. — Military Surgeon, 114 (6): 470-471. June 1954.
DLC (RD1.A7, v. 114)

Recognizing the importance of career guidance, the U.S. Air Force, in 1951, instituted a Career Development Program, which is now in the process of implementation. This program is Air-Force-wide in scope, long-range in nature, and applicable to the regular component, career reservists, and airmen. The Medical Career Control Division of the Surgeon General's Office, USAF, develops and monitors career programs for all members of the USAF Medical Service which includes the six officer corps: Air Force Nurse, Women's Medical Specialist, Medical, Dental, Veterinary, and Medical Service Corps. A separate pattern of career development has been established for the medical airmen. The overall aim

of the program is to monitor and identify accurately, the abilities of all Medical Service personnel as a basis for effective personnel management. This program provides for a progression of assignments, coordinated with on-the-job training and formal instruction within the framework of the specialty. Tools of management used to insure the success of this program are: career progression guides, classification procedures, career records, career outlook data, effectiveness reports, qualification records, assignment and development records, and career profiles. The article explains the role of each of these tools in the assessment of individual progress.

3141
McKirdy, R. W.
ILLUMINATED CONTROLS FOR AIRCRAFT COCKPITS. — Aero Digest, 69 (6): 60-61. Dec. 1954.
DLC(TL501.A292, v. 69)

The advances in cockpit lighting are reviewed. Human-engineering studies have led to recommendation of red light within 6100 to 6800 Ångströms for panel illumination, and eliminated much of the previous confusion caused by flashing multi-colored signal lights. The trend is toward making the lighting integral with the instrument, or to provide light from a common source such as an illuminated panel. A similar development toward simplification may be observed in cockpit instrumentation in the efforts to reduce six or more operations to manipulation of a single control.

3142
Mackworth, N. H. 1953
FINGER NUMBNESS IN VERY COLD WINDS. — Jour. Applied Physiol., 5 (9): 533-543. March 1953.
DLC (QP1.J72, v. 5)

The finger numbing effects of cold winds were assessed by a simple V-shaped device which measures two-point tactile discrimination. Winter tests made in Canada show the effects of raising the wind speed from still air to only a few miles an hour to be just as important as the effects of lowering the air temperature by 5° C. Moderate winds greatly intensify the numbing effects of lower air temperatures. The risk of minor frostbite is greatest in resting men subjected to strong winds and low skin temperatures. (Author's summary)

3143
McLaughlin, S. C.
AN AUTOMATIC-RECORDING VISUAL ADAPTOMETER. — Jour. Optical Soc. Amer., 44 (4): 312-314. April 1954.
DLC (QC350.O6, v. 44)

In connection with research in visual dark adaptation and in anticipation of possible future requirements for testing of Naval aviation cadets, a visual adaptometer, employing a direct mechanical linkage between brightness-control mechanism and recorder, was developed. Brightness of the test field, which is controlled by the subject, is not uniform, one-half being darker than the other by a small fixed amount. The subject's visual threshold is approximated by requiring him to adjust the brightness of the split field so that he is able to see only the brighter portion of it. The device may be operated by the subject with little or no assistance from the experimenter and yields a nearly continuous plot of absolute visual threshold as a function of time. (Author's summary, modified)

3144
MacNeil, R. P.
DESIGNING FOR OPERATOR SIZE AND SHAPE. — Elec. Manufacturing, 53 (3): 110-111. March 1954.
DLC (TK1.E363, v. 53)

Human space requirements, and the effect of body dimensions and muscular activity on the operation and performance of equipment are discussed briefly. Figures of three differently sized subjects are drawn to make visualization of space requirements more lucid.

3145
McNeil, W. J.
AIRCRAFT-TOILET SERVICING UNIT. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-296, June 1954. iii+9 p. (SEO no. 698-29). AD 44 600
UNCLASSIFIED

A servicing unit was developed to provide ground crews with equipment suitable for servicing aircraft toilets. The unit consists of a tank for flush water, a waste collection tank, a hose and nozzle assembly, and a motor-driven air pump. The unit enables one man to clean bucket toilets without handling or removing them from the aircraft. After modifications are completed, one man will be able to clean sump toilets through external fittings on the fuselage. (AD abstract)

3146
McNeil, W. J.
URINE EVAPORATOR. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-94, Feb. 1954. iii + 7 p. (SEO no. 698-29). AD 29 012 UNCLASSIFIED

Methods now in use for the disposal of urine aboard USAF aircraft include overboard drains and inboard collection tanks. Both have drawbacks, and neither is entirely satisfactory. In an attempt to overcome the deficiencies of urine disposal techniques, an assembly that evaporates urine prior to overboard venting has been designed, fabricated and tested. This urine evaporator received urine from standard relief facilities. The urine after entering the evaporator was deionized and evaporated. The vapor was vented overboard. Laboratory and flight tests indicated that the use of deionization resins effectively removed the corrosive properties of urine. However, their use is considered to be impractical because large quantities were required for practical application. Tests further indicated that evaporation of urine does not remove its corrosiveness. Therefore, no benefits can be foreseen from the use of the urine evaporator, and there are no plans for the continuation of this project. (Author's abstract)

3147
McNelly, G. W.
THE DEVELOPMENT AND LABORATORY-VALIDATION OF A SUBJECTIVE FATIGUE SCALE. — (Thesis, Purdue Univ., Lafayette, Indiana). 135 p. Ann Arbor: University Microfilms, 1954. DLC (Microfilm AC-1, no. 9878)

The purpose of this study was to develop a subjective fatigue scale and provide a laboratory validation. Two equivalent forms of a 9-word-phrase scale were constructed by the Thurstone scaling technique. Each scale contained nine stable words and phrases describing various degrees of fatigue and well-being. The subject was asked to check the word or phrase that described his feelings best. Eighty subjects performed on a simple block-turning task, whereby the effort to be expended and working conditions were varied. The subjective fatigue scale was administered (1) before and after work, and (2) only after work. The subjects working under massed work conditions felt significantly more subjective fatigue and were significantly slower in performance than the subjects working under spaced conditions. There was a negative relation between work decrement and change in subjective fatigue. Block weight had no effect on spaced work. (Author's abstract, modified)

3148
MacPherson, R. K.,
and P. S. B. Newling
SALT CONCENTRATION AND RATE OF EVAPORATION OF SWEAT [Abstract]. — Jour. Physiol. (London), 123 (3): 74P. March 29, 1954.
DLC (QP1.J75, v. 123)

The difference between the vapor pressure of water and that of a saturated solution of sodium chloride at skin temperature is small (about 10

mm. Hg at 33-35° C.), but in hot moist conditions the difference between the water-vapor pressure on the skin and that of the air may be no greater. It has been shown experimentally, by examination of the rate of evaporation of standard salt solutions of varying concentration, that under these conditions the reduction in the rate of evaporation of sweat due to the fall in its vapor pressure, which, as evaporation proceeds, accompanies the rising concentration of salt in the sweat on the body when no dripping occurs, can be sufficiently great to prevent adequate loss of body heat by evaporative cooling. The washing of salt and other solutes from the body surface by dripping is the means whereby the salt concentration can be maintained at a level at which adequate evaporation can occur, and may be regarded, not as wasteful, but as a necessary physiological adaptation. As the lower the concentration of solutes in the freshly secreted sweat the less dripping is required, the fall in salt concentration of sweat, which accompanies acclimatization, has other advantages besides the conservation of the body's supplies of sodium chloride. (Quoted in part)

3149
Madden, W. F.
MEASUREMENT OF PERSONALITY VARIABLES BY DEGREE RELEVANCE. — Jour. Aviation Med., 25 (6): 623-629. Dec. 1954.
DLC (TL555.A1A4, v. 25)

A methodology by which trial items are created for use in personality questionnaires was submitted to critical analysis in order to improve their function as stimuli. A stimulus item was designated which permitted the subject to respond in terms of the degree to which the stimulus applied to him, rather that requiring a "yes" or "no" answer. Before an item was accepted for the questionnaire, it was required to demonstrate a characteristic of the individual which was describable in factual and experimental terms; such an item was designated a "quale". The quale also was judged as having relevance to a given criterion. In order to test such items, an experimental questionnaire composed of these quales was administered to 162 engineering students and the test score correlated with a leadership criterion. A correlation of 0.36 was found to be significant beyond the 0.01 level of confidence. (Author's summary, modified)

3150
Maduro, R., 1952
M. Lallemant, and A. Tomatis
[OCCUPATIONAL DEAFNESS] La surdité professionnelle. — Société française d'oto-rhino-laryngologie: Congrès de 1952 (Paris), 59 (pt. 1, Rapports): 5-102, 119-135. 1952. In French. DNLM (W1S0719, v. 59)

A comprehensive review of the theories and clinical developments in the field of noise-induced deafness is presented. Four stages in the development of deafness from industrial noise are distinguished. The initial period, which occurs upon exposure to noise of over 100 decibels for a month or less, is characterized by the raising of the auditory threshold at 4096 c.p.s. to approximately 40 decibels above the normal level. A period of total latency follows, in which adaptation occurs to the point of nearly normal perception. This is followed by a period of subtotal latency, lasting from 2-15 years, when the frequency range and threshold difference at 4096 c.p.s. are increased. In the terminal period all frequencies are seriously affected, and the threshold difference at 4096 c.p.s. increases to approximately 80 decibels. Audiographs illustrating these stages as well as various other specific phenomena are presented. Etiological factors, including age, ear characteristics, and individual susceptibility are discussed. Physiopathological interpretations are considered, and particular attention is given to the theory that hearing damage occurs through reflexive contraction of the middle ear muscles. The question

of the peak threshold alteration at 4096 c.p.s. is discussed, and the hypothesis of Ruedi and Furrer regarding vibration of the endolymph confirmed. Various audiometric determinations of industrial noises (chiefly from engines) have been performed, and the results are presented. Means of decreasing the possibility of damage to hearing, including individual ear protection, noise diminution, and personnel selection, are discussed. The responsibility of the employer and the need of protective and compensatory measures are stressed. For a discussion of this article, see item no. 3579. (434 ref., p. 119-135).

3151
Maggio, R. C.,
and T. Gilhooly
THE PROTECTIVENESS OF MILITARY PONCHO MATERIAL AGAINST INTENSE THERMAL RADIATION. — New York Naval Shipyard. Material Lab., Brooklyn. Final Report. Lab. Project 5046-3, Pt. 72, Nov. 19, 1954. [14] p. AD 50 034 UNCLASSIFIED

A military type poncho was evaluated by the Naval Material Laboratory to determine the protection which would be afforded bare skin against burns from high-intensity thermal radiation. As determined by an analysis of the temperature-time histories of a plastic skin simulant behind the poncho material and comparison with similar histories derived from pig burns and the NML polyethylene correlation studies, it may be concluded that the poncho would give little protection to the hands, head and face. The observed thermal degradation effects of melting and afterflaming, which occur at radiant exposures of approximately 3 and 10 cal./cm^2., respectively, present serious burn hazards. The protection afforded by use of the poncho material above another material (a 2-layer system) is limited by the high flammability of the inner fabric after ignition of the poncho at radiant exposures corresponding to and in excess of 10 cal./cm^2. (Authors' summary)

3152
Mahadeva, K., 1953
P. Passmore, and B. Woolf
INDIVIDUAL VARIATIONS IN THE METABOLIC COST OF STANDARDIZED EXERCISES: THE EFFECTS OF FOOD, AGE, SEX AND RACE. — Jour. Physiol. (London), 121 (2): 225-231. Aug. 28, 1953. DLC (QP1.J7, v. 121)

The metabolic cost of standardized stepping and walking has been determined in fifty subjects and shown to be linearly porportional to body weight. Statistical analysis showed that no significant increase in the precision of individual assessments is gained by taking into account height, age, sex, race, or resting metabolism. (Authors' summary)

3153
Mahl, G. F.,
and E. B. Brody
CHRONIC ANXIETY SYMPTOMATOLOGY, EXPERIMENTAL STRESS, AND HCl SECRETION. — A. M. A. Arch. Neurol. and Psychiatry, 71 (3): 314-325. March 1954. DLC (RC321.A65, v. 71)

An attempt was made to determine experimentally on human subjects if an increased HCl secretion is a function of the change from acute-emergency to sustained anxiety. Secondary objective was to obtain further empirical data of HCl secretion and anxiety in humans. The procedure consisted of (a) comparing the fasting gastric acidity levels of seven subjects presenting chronic anxiety symptoms and of a group of seven subjects not presenting such symptoms; and (b) comparing the fasting HCl secretory response of these two groups when subjected to one experimental anxiety-evoking situation based upon pain and pain anticipation stimulation and another consisting only of pain anticipation stimulation. Because of methodological limitations, the desired differential pretest anxiety in the two groups was not obtained. Therefore the nature of HCl secretion during acute-emergency anxiety could not be studied. The gastric acidity of

the original "chronic anxiety" group was greater than that of the control group, but this difference was only suggestive reliability. When one subject was eliminated from each group to achieve a more homogenous anxiety structure, the gastric acidity of the "chronic anxiety" groups was significantly greater than that of the control group. When pain and pain-anticipation stimulation and response interacted with the sustained pretest anxiety, there was a significant increase in HCl secretion. Both these findings are consistent with the first hypothesis and reveal the invalidity of unqualified extension of the emergency theory of emotion to chronic emotions. (Authors' summary, modified)

3154
*Makarova, A. P. 1953
[EFFECT OF LIGHT ON GASEOUS METABOLISM IN SOME MAMMALS] O vliîanii osveshcheniîa na gazoobmen u nekotorykh mlekopitaîushchikh — In: Opyt izucheniîa reguliatsii fiziologicheskikh funktsiĭ v estestvennykh usloviiakh sushchestvovaniîa organizmov, p. 102-108. Moskva-Leningrad: Izdatel'stvo Akademii Nauk SSSR, 1953. In Russian.

Rodents and insectivora were kept in tightly constructed glass chambers provided with natural illumination and with facilities to create artficial changes in light intensity during periodically identical hours of the day. Results of the tests, which extended over 60 - 90 minutes showed that in the case of the forest mouse, the house mouse, and the dormouse (animals active during the night), reduction of light intensity during the day acted as a stimulating "signal" and increased the activity of the animals by 6-11%. In the case of the field mouse and the species of small susliks (animals active during the day), reduction in light intensity lowered their metabolic rate by 8-9%. In the case of the porcupine (which is normally active at twilight), reduction in light intensity during the day lowered its rate of oxygen consumption by only 3%. Under conditions of natural illumination, a maximum rate of gaseous metabolism of these animals was manifested at twilight. Tests of 3 hours duration conducted at different hours of the day with small susliks showed highest metabolic rate during early morning hours, when their activity was normally highest; their reaction to artificially reduced light intensity was strongest only during the early morning hours; lowest rate of metabolism was observed experimentally or under natural light conditions during the evening hours. Successive natural illumination and darkening of the chambers in which the forest mice and the dormouse were kept produced changes in the rate of oxygen consumption of different magnitudes, which pointed to the forest mouse as a twilight active animal and to the dormouse as a nocturnal animal. Continuous illumination or continuous darkening of the chambers of either of these animals disturbed their normal course of metabolism. Makarova concludes that daily periodicity of the metabolic processes was controlled by the action of the cerebral cortex. (Referativnyi zhurnal, Biologiîa, 1954. Abstract No. 15496)

3155
Malcolm, D .
EDUCATION IN AVIATION MEDICINE: A SURVEY OF GRADUATE OPINIONS PERTAINING TO THE PRIMARY COURSE AT THE SCHOOL OF AVIATION MEDICINE. – Human Resources Research Inst., Maxwell Air Force Base, Ala. Technical Research Report no. 27, Jan. 1954. xxi+119+56 p., 39 charts; and Syracuse Univ. Psychological Research Center, N. Y. AD 30 903 PB 117 987

The survey was undertaken (1) to ascertain the relevance of the curriculum elements in the primary course to the kinds of duties discharged by the medical officers after their graduation from the School of Aviation Medicine, and (2) to obtain students' opinions con-

cerning the relative amounts of emphasis which they believe should be placed on the various elements of the primary course curriculum. Questionnaires were used from 240 graduates of the School of Aviation Medicine. The findings are considered from the standpoint of functional job areas and specific aeromedical activities. On the whole, the primary course at the School of Aviation Medicine was favorably received by its graduates. The suggestion was made that more emphasis should be laid upon aviation medicine and flight familiarization, and less attention given to aspects of general medical practice. (AD abstract, modified)

3156
Malméjac, J.,
and A. Gross
[AVIATOR'S FATIGUE FROM A PHYSIOLOGICAL VIEWPOINT] La fatigue chez l'aviateur: reflexions au point de vue physiologique. — Médecine aéronautique (Paris), 9 (2): 135-143. 1954. In French. DLC (TL555.M394, v. 9)

Aviator's fatigue constitutes an extremely complex psychosomatic phenomenon. It manifests itself in various ways, though, from the viewpoint of aviation, nervous exhaustion is the dominant element. While it is not easy to define the beginning of fatigue, one may say that physiological and psychological stress reactions tend to become overcompensated, and that the cumulative effect of several, even small reactions may eventually result in the fatigue syndrome. To illustrate this fact, the author selects two typical reactions which take place under stress: (1) Anoxia leads to oversecretion of adrenaline by the adrenal glands which in turn stimulates the pituitary gland to the production of A.C.T.H, causing deficiency of lymphocytes in the circulating blood; the adjustment of the organism to the lack of lymphocytes produces fatigue. (2) Mild anoxia (corresponding to 2,500-3,000 m. altitude) may stimulate the cerebral cortex, while more pronounced anoxia (6,000-6500 m. altitude) causes a slackening of nervous responses. It is up to the physiologist to establish the physiopathological relations between the causes and effects of fatigue, especially the interaction between stress, adaptation, and fatigue phenomena; and it is the task of the psychologist to analyze the subjective aspects of fatigue sensations.

3157
Malméjac, J.,
[and Kuhn]
[PSYCHOLOGICAL SUPERVISION OF FLYING PERSONNEL] Surveillance psychologique du personnel navigant. — Médecine aéronautique (Paris), 9 (4): 397-423. 1954. In French.
DLC (TL555.M394, v. 9)

To secure optimal performance, flying personnel must be under constant psychological supervision. The reasons of physical failures may be simple fatigue, psycho-social factors, financial worries, etc. To determine these influences and, if possible, to avoid them, the psychological supervision of pilots should be carried out at several levels: (a) early detection of emotional or behavioral conditions which may lead to psychological failure; (b) a thorough examination to determine and eliminate physical conditions which affect the nervous system unfavorably; and (c) in cases of uncertainty as to the underlying factors of psychical instability, especially of a progressive nature, a complete psychological examination is in order. Such an examination is a difficult and delicate matter and should not be restricted to the ordinary tests (electroencephalogram, psychomotor, Rohrschach) but must delve into the subconscious, social, and family conditions. In the discussion of the paper, Kuhn mentions the close relation between selection of pilots and subsequent supervision. This requires first to establish confidence of the pilot in his psychologist and his full cooperation in discussing freely all his problems.

3158
Maloney, J. V.,
and S. W. Handford
CIRCULATORY RESPONSES TO INTERMITTENT POSITIVE AND ALTERNATING POSITIVE-NEGATIVE PRESSURE RESPIRATORS. — Jour. Applied Physiol., 6 (8): 453-459. Feb. 1954. DLC (QP1.J72, v. 6)

Experimental animals with competent circulatory and respiratory systems tolerate either the positive-negative or the intermittent positive type respirators without major alterations in blood pressure or cardiac output. In the presence of respiratory failure and/or circulatory embarrassment, the intermittent positive type machines cause a depression in cardiac output and blood pressure which is sometimes fatal. The positive-negative type machines are distinctly superior in such circumstances, since they maintain adequate cardiac output and blood pressure. This latter type of respirator owes its desirability to a more favorable effect on venous return to the heart. The objection that a negative pressure phase during expiration may produce pulmonary edema is not supported by experimental findings or theoretical considerations. (Authors' summary)

3159
Maltzman, I.,
William M. Smith, and L. Brooks
FIXATION PROJECT. — Univ. of California, Los Angeles, Dept. of Psychol. (Contract DA-04-495-Ord-381). Final Report Oct. 15, 1952-Oct. 30, 1954. Issued by Dept. of Army (Project No. 599-01-004). Office of Ordnance Research, Durham, N. C. (Project TB2-0001 (450)). [No date] 46 p. AD 46 965 UNCLASSIFIED

Experiments were conducted on (1) serial rational learning under conditions of manifest anxiety, as measured by the Taylor Manifest Anxiety Scale, and anxiety induced by threat of electric shock; (2) the relationships between some personality variables, methods of instruction, and problem-solving behavior; and (3) some effects of different training conditions and manifest anxiety upon target pursuit and fixation. Relative success in tracking a target under long practice conditions was related to ratings of low anxiety, but other results contradicted or were ambiguous with respect to the hypothesis which held that increased amounts of manifest anxiety would be related to a decrease in proficiency and an increase in fixation. Success in the rational learning problem was greatest under the condition of low anxiety, but the presence of medium anxiety rather than of high anxiety was associated with the least proficient performance. Manifest anxiety did not have a significant influence upon the speed of shifting to a new target, but the variable of target speed during training had a highly significant effect upon subsequent success in target shifting. (AD abstract)

3160
Manara, H. I.
[DISORDERS CAUSED BY TRAVELING: EFFECT OF DRAMAMINE] Trastornos provocados por los viajes. Acción del dramamine. — Prensa médica Argentina (Buenos Aires), 41 (12): 806-807. March 19, 1954. In Spanish. DNLM

A brief discussion is presented on the symptoms of motion sickness and on the therapeutic effect of dramamine. Dosages are given, and symptoms of drug intolerance described.

3161
Mancioli, G., 1952
and G. Pestalozza
[PREVENTION OF OCCUPATIONAL DEAFNESS IN A NOISY INDUSTRY, WITH SPECIAL REFERENCE TO THE TEXTILE INDUSTRY] La profilassi della sordità professionale nelle industrie rumorose con particolare riferimento alle industrie tessili. — Rassegna di medicina industriale (Roma), 21 (5): 374-378. Sept.-Oct. 1952. In Italian. DNLM

The anatomical and clinical characteristics of occupational deafness are discussed It is noted that workers exposed to a noise intensity of approximately 95 decibels may develop a hearing disorder. In the textile industry the following studies were made: (1) the noise intensity in the weaving rooms as well as in other areas of the factory was measured; (2) employees were subjected to preliminary otorhinolaryngological examinations (to exclude the presence of other non-occupational causes of deafness); and (3) pre- and post-employment audiometric tests were performed. On the basis of these studies measures for the prevention of occupational deafness are discussed.

3162

Mancioli, G. 1953

[NOISE IN INDUSTRY: OCCUPATIONAL DEAFNESS] Il rumore nelle industrie: sordità professionale. — Rassegna di medicina industriale (Roma), 22 (3): 158-171. May-June 1953. In Italian. DNLM

The characteristics of industrial noise are distinguished, and a brief review is presented of the effects of noise on the nervous system, including mental and psychomotor disturbances. Special consideration is given to the problem of noise-induced deafness in industry from the standpoint of its pathology and diagnosis A discussion on the prevention of occupational deafness includes suggestions for reducing noise in the work environment, screening employees susceptible to deafness by preventive and periodic audiometry, and applying various mechanical means to the ears (cotton plugs, acoustic filters, caps, etc.) in order to control noise.

3163

Mangiacapra, A., 1953
and M. Strollo

[PERCEPTIVE CAPACITY IN JET PILOTS] La capacità percettiva nei piloti di aviogetti. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 318-330. In Italian, with English summary (p. 329). DNLM (W3.C0943a)

Perceptual ability of jet pilots was measured by means of Netchaeff's tachistoscope, comparing individual averages with professional efficiency. A perceptual capacity higher than that required for pilots in general was displayed by jet pilots. Utilizing tables and graphs it is concluded that: (1) best results are obtained in subjects between 26 and 33 years of age; (2) test results are greatly improved by exercise (which suggests the usefulness of tachistoscopic ground training for jet pilots); (3) an initial adaptation and terminal fatigue generally appear in each test; (4) there exists a positive correlation between the perceptive constancy and the constancy of psychomotor reaction.

3164

Mangiacapra, A., 1953
and G. Maffezzioni

[ON THE PERSONALITY OF JET PILOTS: RESEARCH WITH THE SZÖNDI TEST] Sulla personalità dei piloti di aviogetti. Ricerche con lo Szöndi-test. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 311-317. In Italian, with English summary (p. 317). DNLM (W3.C0943a)

Szöndi tests (projective technique using pictorial stimuli) given to jet pilots revealed: (1) an emotionally hypercontrolled personality, and (2) a high incidence of latent and diffuse anxiety.

3165

Mangiacapra, A., 1953
and M. Strollo

[PSYCHOMOTOR REACTION TIME IN JET PILOTS] Il tempo di reazione psicomotoria nei piloti di aviogetti. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 331-339. In Italian, with English summary (p. 339). DNLM (W3.C0943a)

Psychomotor reactivity in jet pilots was measured by means of light stimuli using Costa's apparatus with an electric recording device. The results showed that: (1) lower values are generally observed in younger pilots; (2) test results improve with exercise; (3) a positive correlation exists between the constancy of psychomotor reaction and perceptive ability. (Authors' summary, modified).

3166
Manhold, J. H.
A COMPARATIVE STUDY OF SEVERAL METHODS OF MEASURING DENTAL CARIES IN MAN. — Naval School of Aviation Medicine, Pensacola, Fla. Sept. 3, 1954. [5] p. (Report no. NM 001 057.11.05). AD 50 293
UNCLASSIFIED

The present study shows that there is a high (.90-1.00) correlation between the Modified Caries Index and various other possible methods of indexing dental caries. Since correlations of this magnitude indicate that results from any of the various methods produce almost identical ranking, it may be concluded that any of several possible measures may be used for indexing dental caries in man. It would further appear that data which have been previously considered unreliable, because they were collected before the advent of the Modified Caries Index, should be reexamined in the light of this evidence. (From the author's summary)

3167
Manhold, J. H.,
and R. S. Melton
A STUDY OF PSYCHOSOMATIC FACTORS IN ORAL PATHOLOGY. — Naval School of Aviation Medicine, Pensacola, Fla. April 12, 1954. 9 p. (Project Report no. NM 001 057.11.03). AD 35 119
UNCLASSIFIED

The DMF (decayed, missing filled teeth) rating was computed for a sample of 259 Naval Aviation Cadets and related to the Minnesota Multiphasic Personality Inventory (MMPI). At the 0.05 level of confidence, no MMPI-DMF correlation was considered significant. All of the coefficients were negative, which suggests a tendency for men with poor dental histories to have more normal scores than those with good dental histories. The results lead to the conclusion that certain complex relationships do exist between oral pathology and personality variables. They further substantiate the Manhold-Rosenberg hypothesis that dental psychosomatic relationships appear to be a function of the more basic adjustment factors. (AD abstract)

3168
Manning, G. W.
ELECTROCARDIOGRAPHY IN THE SELECTION OF ROYAL CANADIAN AIR FORCE AIRCREW. — Circulation, 10 (3): 401-412. Sept. 1954.
DLC (RC681.A1C5, v. 10)

Routine electrocardiograms of 5000 apparently healthy, fit male applicants for aircrew training in the Royal Canadian Air Force between the ages of 18 and 24 years were reviewed. Abnormalities were observed in the tracings of 158 subjects and were further investigated. T-wave abnormalities occurred in 95 applicants, prolongation of the QRS complexes (including the Wolff-Parkinson-White syndrome) in 28, prolongation of the P-R interval in 23, and miscellaneous changes in 12 applicants. In many instances the apparent abnormality could be explained as a variation of normality on repeat study (including multiple-lead electrocardiograms). In 27 men, 15 of whom revealed some associated clinical cardiovascular findings, a significant abnormality persisted, and they were considered as unfit for pilot training.

3169
Mansour, T. E.,
and W. F. Hewitt
SENSITIVITY TO INSULIN DURING ADRENOCORTICAL RESPONSE TO COLD STRESS IN RATS. — Endocrinol. 54 (1): 20-25. Jan. 1954.
DLC (QP187.A25, v. 54)

Adult rats were exposed to cold stress (5°C.) for one day, six days, or nine days continuously. Blood sugar change due to insulin was measured before and after such exposure. The response of the adrenal glands of normal and stressed rats was determined by measurement of adrenal cholesterol, ascorbic acid, and the ratio of total adrenal weight to body weight. Cold stress for one day, although it produced no significant change in blood sugar or insulin sensitivity, caused marked depletion of adrenal cholesterol and ascorbic acid content. In the group exposed for six days hyperglycemia with hypersensitivity to insulin appeared while the adrenal showed signs of higher activity. The rats exposed for nine days still had hyperglycemia and hypersensitivity to insulin, although the adrenal activity returned to near normal levels. The results suggested that there is no direct correlation between corticoadrenal activity and sensitivity to insulin. (Authors' summary, modified)

3170
Mantegazzini, P.
[ELECTROENCEPHALOGRAPHIC OBSERVATIONS ON THE EFFECTS OF HYPEROXIA IN THE RABBIT] Osservazioni elettroencefalgrafiche sugli effetti dell'iperossia nel coniglio — Minerva medica (Torino), 45 (94): 1332. Nov. 24, 1954. In Italian. DNLM

Rabbits subjected to hyperoxia for 10-30 minutes demonstrated epileptic electroencephalographic tracings of the grand mal type. Under the same conditions, rabbits with the brain stem sectioned at the upper portion of the pons and rabbits after electrostimulation of the optic nerve in isolated brain preparations did not show a modification of the EEG. These observations indicate that the cerebral cortex is not susceptible to the toxic action of O_2 and sustain the hypothesis that hyperoxic convulsions are of subcortical origin.

3171
Margaria, R.,
and F. Marro
[DETERMINATION OF MAXIMUM RESPIRATORY WORK AS A FUNCTIONAL TEST] La determinazione del massimo lavoro respiratorio come prova funzionale. — Rivista di medicina aeronautica (Roma), 17 (4): 385-390. Oct.-Dec. 1954. In Italian, with English summary (p. 389).
DLC (TL555.A1R5, v. 17)

A rapid and simple method to determine the maximum potential work of the respiratory apparatus is described. Fifty healthy subjects and 20 subjects with pulmonary injuries were tested. Maximum potential work values were found to be 36.40 ± 8.55 calories and 10.50 ± 3.97 calories. The difference between the respiratory work values, determined in the two groups, is from a statistical standpoint, much more significant than the difference between the vital capacity values, though they are quite often employed as a test of efficiency for the respiratory apparatus. (Authors' abstract, modified)

3172
Margaria, R.,
F. Marro, and G. Giustina
[THE RATE OF BREATHING IN RELATION TO PULMONARY VENTILATION AS A TEST OF RESPIRATORY FUNCTIONS] La frequenza respiratoria in funzione della ventilazione polmonare come prova della funzionalita dell'apparato respiratorio. — Rivista di medicina aeronautica (Roma), 17 (4): 391-398. Oct.-Dec. 1954. In Italian, with English summary (p. 396).
DLC (TL555.A1R5, v. 17)

A group of healthy subjects and a group of subjects with respiratory illnesses were studied to determine the rate of breathing as a function of pulmonary ventilation. It was found that this function may be represented by a straight line and corresponds to the formulae, $F = (9.48 + 20.15V) \pm 3.83$ for healthy persons and $F = (15.15 + 27.5V) \pm 5.56$ for persons afflicted

with pulmonary diseases. The higher the ventilation value the more significantly different are the two functions from each other. With a ventilation value of 1.0 l./kg./min. the probability of the difference being significant equals 99.65%. With ventilation values equal to or higher than this, it is possible to determine, with some degree of reliability, from the breathing rate value whether the examined subject belongs to the normal group or to the pathological group

3173
Marks, M. R.,
and J. E. Uhlaner
THE PREDICTION OF NIGHT FIELD PERFORMANCE BY VISION TESTS ADMINISTERED UNDER LOW ILLUMINATION [Abstract] — Amer. Psychologist, 9 (8): 427. Aug. 1954.
DLC (BF1.A55, v. 9)

The problem was to develop a test for measuring visual acuity at mesopic light levels (levels between extreme black-out and daylight). Portability, economy, and a self-contained, calibrated light source were additional desired features of the test. Several visual acuity tests were administered to 256 infantrymen under mesopic conditions (6.67 log $\mu\mu$L) in an instrument with characteristics described above. The targets of the visual acuity tests had been preselected on the basis of empirical item difficulties and reliabilities at various light levels. Dark-adaption time had been predetermined empirically to be 10 minutes for the mesopic level used. The criterion used was a score on a night field-detection course. Obtained validity for a mesopic Letter Test was .35. This contrasted with a Scotopic Landolt Ring Test for which validity was .21. Reliabilities of the predictors obtained in another study ranged from .64 to .92. For 72 subjects test-retest criterion reliability was .46. It was concluded that field night-vision ability can be predicted with reasonable efficiency using a portable, relatively inexpensive instrument test that is suitable for fairly rapid measurement. (Abstract, modified)

3174
Martin, C. J., 1953
F. Cline, and H. Marshall
LOBAR ALVEOLAR GAS CONCENTRATIONS: EFFECT OF BODY POSITION. — Jour. Clinical Investigation, 32 (7): 617-621. July 1953.
DLC (R11.J67, v. 32)

The end-expiratory alveolar gas concentrations within the lobar bronchus of the right upper lobe and right lower lobe were measured simultaneously in 31 subjects with normal lungs. The samples were taken with the subject in the horizontal position, in 10-to-30-degree Trendelenburg and in the upright position. The following lobar differences in alveolar gas concentrations were observed: In the upright position, end-expiratory oxygen is higher and carbon dioxide lower in the right upper lobe than in the right lower lobe. When the subject is in a supine position, the oxygen concentration is higher and the carbon dioxide concentration is lower in the right lower lobe than in the right upper lobe. The respiratory quotient shows no significant difference between the two lobes. Apparently ventilation-perfusion relationships are not as greatly altered in this position as in the upright position. In the Trendelenburg position there is no statistically significant difference between the upper and lower gas concentrations. (Authors' summary, modified)

3175
Mastropaolo, S.,
A. Carp, R. L. Erdmann, and John Schmid
A STUDY OF THE RELATIVE EFFECTS OF SIX-WEEK AND TWELVE-WEEK EXPERIMENTAL BASIC TRAINING PROGRAMS ON A SAMPLE OF LIMITED-APTITUDE AIRMEN: I. BASIC TRAINING ANALYSES. II. SIX-WEEK FOLLOW-UP ANALYSES. — Air Force Personnel and Training Research Center. Personnel Research Lab., Lackland Air Force Base, Tex.

Research Bulletin no. AFPTRC-TR-54-36, Sept. 1954. vi+41 p. (Project no. 7705, Task no. 77111). AD 53 832 PB 115472

Two groups of limited-aptitude basic airmen were administered a 6-week and 12-week experimental basic training program, respectively, to determine the differential effects resulting from the addition for the 12-week group of the extra 6 weeks of training ("Project 1000"). Among the differences between the training programs were 45 hours of language arts and 45 hours of mathematics in the long course. No instruction in these two areas was included in the shorter curriculum. Prior to training, airmen comprising each treatment group were comparable with respect to age, education, race, area of enlistment, and performance on a number of tests including the airmen classification battery, attitude survey, airmen activity inventory, cooperative inter-American test of general ability (primary and intermediate levels), and a spelling test. The results of the study indicate that, with a few minor exceptions, the two training programs produced comparable results.

3176
Mastropaolo, S.,
A. Carp, and R. L. Erdmann
A STUDY OF THE RELATIVE EFFECTS OF SIX-WEEK AND TWELVE-WEEK EXPERIMENTAL BASIC TRAINING PROGRAMS ON A SAMPLE OF LIMITED-APTITUDE AIRMEN: III. EIGHT-MONTH FOLLOW-UP COMPARISONS. — Air Force Personnel and Training Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. AFPTRC-TR-54-37, Sept. 1954. vi+21 p. (Project no. 7705, Task no. 77111). AD 53 831 PB 115829

With the single exception of a basic training achievenent test, which covered military fundamentals and favored the 12-week group, the two experimental groups of "Project 1000" (cf. item no. 3175) airmen were not significantly different at the end of eight months on the job when adjustment, job knowledge and performance, aptitude, attitude, and other measures of academic achievement were considered. The largest majority (69%) of the total experimental airman sample were initially assigned to five supporting type of career fields, as follows: Food Service, Motor Transportation, Supply, Air Police, and Medical. At the end of eight months, the following new rank-ordering was noted: Motor Transportation, Supply, Air Police, Food Service, and Construction. (From the authors' summary and conclusions)

3177
Matheny, B. J 1953
VECTORING AIRCRAFT BY RADAR: THE EFFECT OF LOAD AND SPEED DIFFERENCES ON CONTROLLERS' PERFORMANCE IN A SIMULATED AIR TRAFFIC SITUATION. — (Thesis, Univ. of Illinois, Urbana, Ill.) 107 p. Ann Arbor: University Microfilms, 1953. DLC (Microfilm AC-1, no. 6966)

The study was designed to determine the effects of load (number of aircraft pips under simultaneous control) and the speed differences between pips upon radar vectoring performance. Loads of 3, 6, and 8 aircraft pips were used with speed conditions from 120-190 m.p.h. in an experimentally simulated terminal area air-traffic control situation. It was found that both the load of pips and the speed differences between these pips affected the efficiency and safety with which the aircraft were vectored. Performance deteriorated as (1) the speed differences between aircraft were increased and (2) the load of aircraft pips was increased. The former exerted a greater effect on performance. When all aircraft were flying at the same speed, an increase of load to eight aircraft had no significant effect upon performance. When aircraft were traveling at different speeds, an increase in load as well as an increase in speed differences resulted in quick

deterioration of performance. (From the author's abstract)

3178
Matter, W.,
and S. Bolikowski
[POST-INFECTIOUS ANOREXIA AND ITS TREATMENT BY ATMOSPHERIC DEPRESSION (AIRPLANE OR DECOMPRESSION CHAMBER)] L'anorexie post-infectieuse et son traitement par la dépression atmosphérique (avion ou caisson). --- Médecine aéronautique (Paris), 9 (1): 19-24. 1954. In French. DLC (TL555.M394, v. 9)

Exposure to altitude has been found to bring about recovery from anorexia. The method is most effective if undertaken in an airplane or in a decompression chamber. Recovery may be attributed to stimulation of the hematopoietic system and of the blood circulation, to blood-clot solving action, and to increase of the vital capacity and of the respiratory volume.

3179
Matthews, B.
LIMITING FACTORS AT HIGH ALTITUDE. — Proc. Roy. Soc. (London), 143 (10): 1-4. Dec. 1954. DLC (Q41.L7, v. 143)

The initial symptoms of chronic anoxia, such as vomiting, nausea, muscular weakness, and incoordination can be partially overcome by acclimatization. The changes occurring in acclimatization fall into three classes: (1) increase in the number of red blood cells and hemoglobin; (2) changes in respiration; and (3) cellular acclimatization. The first two have been explored extensively, whereas little is known of the latter, although there is evidence accumulating which suggests that cellular acclimatization is a major factor in adaptation to altitude. The limit for permanent adjustment to altitude appears to lie at about 18,000 ft. Above this altitude, deterioration sets in due to action of two vicious circles of physiological limits: The first is chiefly respiratory, as a result of an increase in respiration to gain more oxygen, which in turn leads to increased oxygen consumption by the respiratory muscles and the heart. Near 30,000 ft. there is just enough oxygen to be gained from the air to support the work of breathing, with little left for movement. The second cycle is a thermal cycle, which follows the respiratory cycle closely. The loss of heat through evaporation of water in breath increases as the respiration increases, until a point is reached where the heat loss exceeds the potential gain from oxygen absorbed, and the man is no longer able to maintain his body temperature. The limits set by these cycles have been exceeded with the help of thermal respirators and oxygen above certain altitudes.

3180
Maynard, E. G. D.
AERODYNAMIC EFFECTS ON CABIN ALTITUDES. — Royal Canadian Air Force. Inst. of Aviation Medicine, Toronto. Report IAM no. 54/3, Dec. 1954. 3 p.+ 2 tables + 2 figures. AD 58 096 UNCLASSIFIED

Same as item no. 1805, vol. II.

3181
[Mayo, A. M.] 1953
AIRCREW AT ALTITUDE. — Flight (London), 64 (2341): 727-728. Dec. 4, 1953. DLC (TL501.F5, v. 64)

Problems of high altitude cockpit air-conditioning and pressurization, acceleration loads, noise, and radiations are reviewed in relation to efficiency of the man-machine combination. In addition, factors of normal time lag in the human operator in taking action after receipt of sensory stimuli, and factors in cockpit design including emergency escape system are noted.

3182
Mayo, A. M.
SOME INFLUENCES OF AERO MEDICAL DATA ON AIRCRAFT DESIGN. — Jour. Aviation Med., 25 (6): 667-670. Dec. 1954. DLC (TL555.A1A4, v. 25)

The author presents several illustrative examples of the influence of aero-medical research on aircraft design. The entire area forward of the cockpit is designed according to specifications furnished by aero-medical data. The passenger compartment of commercial planes as well as the cargo areas of such planes are designed and constructed to specifications demanded by man's dimensions and abilities. Aero-medical factors require equipment for oxygenation and pressurization in high-altitude operations. Such factors also determine to a large extent the type and amount of air conditioning equipment, the cross-sectional design with respect to insulation and sound-deadening materials, the instrument panel configuration, automatic controls, computing functions, fire control equipment, and radar. The entire basic structure of the aircraft is often based on aero-medical data, including such design tolerances as those for internal cabin pressurization and wing load factors. Escape equipment also affects the overall configuration of the aircraft.

3183
Mazzei, F.,
and F. Costa
[INNER EAR AND CHRONIC GASOLINE POISONING] Orecchio interno ed intossicazione cronica da benzina. — Archivi italiani di laryngologia (Napoli), 62 (6): 417-432. Nov.-Dec. 1954. In Italian.
DNLM

Clinical and experimental data on chronic gasoline poisoning, including aviation gasoline, are presented with special reference to its manifestations within the inner ear (parenchymal changes, tympanic hemorrhage, deafness). In addition, the pathogenesis, histopathology and symptoms of gasoline-induced deafness are discussed.

3184
Meager, D.
PRODUCING THOSE AIRLINE PILOTS: A THIRD CONTRIBUTION ON A THORNY SUBJECT. — Flight (London), 65 (2346): 39-40. Jan. 8, 1954.
DLC (TL501.F5, v. 65)

The problem of future pilot training is presented along with a possible solution. The feasibility of establishing a flight-training college for 18-year-old boys with a reasonably high educational standard is proposed. Following a 3- to 4-year training period they would emerge as qualified pilots, well versed in the art of flying, possessing a sound theoretical background, the necessary civil licenses, and a certain amount of specialized training in the particular branch of flying which they have chosen. A curriculum is outlined and the financial problems to be encountered noted.

3185
[Medical Research Council (Gt. Brit.)]
HIGH ALTITUDE RESEARCH. — Jour. Amer. Med. Assoc., 156 (6): 626-627. Oct. 9, 1954. DLC (R15.A48, v. 156)

This letter briefly summarized a review contained in the 1952/53 annual report of the Medical Research Council in Great Britain, concerning the preparations made for Sir John Hunt's conquest of Mt. Everest in 1953. Experiences on earlier expeditions had indicated that direct ascent to high altitude would have deleterious effects (incapacitating exhaustion, diarrhea, upper respiratory infections), and it was therefore recommended that members of the 1953 expedition should spend a month in the Himalayas to become acclimatized and to pass through the stage of initial infections before beginning the ascent of the mountain. While training for the final assault, the climbers wore their masks for part of each day on the approach march, and trial ascents were made with both open- and closed-circuit oxygen sets. They also learned to sleep comfortably wearing a light BOAC mask and breathing 1 liter of O_2 per minute. A flow rate of 2 liters O_2 per minute was found adequate for descent and for the second man on the rope during ascent, but 4 liters were needed by the leader while

cutting steps or making tracks. Work rate was not significantly improved by the use of oxygen up to 22,000 ft., but above this altitude the improvement in climbing rate became increasingly evident. At all altitudes above 18,000 ft., endurance was greatly enhanced. Breathing was easy, there was less sense of effort, and fatigue at the end of the day was markedly diminished. More prolonged exertion was possible in a day with the help of oxygen than without it. Oxygen at night induced warmth and sleep and provided recovery from fatigue. Provisions for food rations, protective clothing, and equipment are also described.

3186
Medvedeva, N. N.
[PROBLEMS IN AVIATION MEDICINE] Voprosy aviatsionoĭ meditsiny. — 283 p. Moskva: Izdatel'stvo Inostrannoĭ Literatury, 1954. In Russian.

This is a compilation of 18 representative American, British, and French papers on aviation medicine translated into Russian. A bibliography containing 585 references, all of them of Western European or American origin, is attached.

3187
Melton, R. S.
A NOTE ON PERSONALITY PROFILES OF NAVCADS AS COMPARED WITH COLLEGE STUDENTS: SOME EVIDENCE OF SELECTIVE FACTORS. — In: (Naval School Aviation Med.), Miscellaneous test and minor evaluations, p. 33-38. Pensacola, Fla. Oct. 20, 1954. (Project Report no. NM 001 058.25.25). AD 55 782(g)
UNCLASSIFIED

The Minnesota Multiphasic Personality Inventory (MMPI) profiles of 543 naval cadets who entered training in classes 22-53 through 33-53 were coded according to the system of Hathaway and Meehl (An Atlas for the Clinical Use of the MMPI. University of Minnesota Press, Minneapolis, 1951). The frequencies of the various profile categories were compared with a sample of college students from the University of Wisconsin. The most notable differences occurred in the Ma-Pd (hypomania and psychopathy-asocial, amoral types) and Pd-Ma combinations; there were two to three times as many of these profiles among the cadets as among the college group. Conversely, there were less profiles with peaks on hypochondriasis, depression, hysteria, paranoia, psychasthenia, and schizophrenia. It was concluded that selected factors are operating as to the kinds of men who apply for the Naval Aviation Training Program. (AD abstract)

3188
Melton, R. S.
STUDIES IN THE EVALUATION OF THE PERSONALITY CHARACTERISTICS OF SUCCESSFUL NAVAL AVIATORS. — Jour. Aviation Med., 25 (6): 600-604, 650. Dec. 1954.
DLC (TL555.A1A4, v. 25)

The author proposes a new approach to the evaluation of psychological test data for predicting personality characteristics that are important for success in flight training. The Minnesota Multiphasic Personality Inventory is being used as an experimental test instrument. This particular test was chosen because it contains nine diagnostic scales for measuring tendencies, i.e., hypochondriasis, depression, hysteria, etc., and has empirically derived scales on which there has been considerable research. The author discusses the mathematical principles which allow a useful conceptual scheme for considering multivariate personality data, namely, n-dimensional geometry, and demonstrates how these data can be interpreted graphically.

3189
Merayo, F., and D. J. Ruiz Gijon 1953
[STUDIES ON CIRCULATORY CHANGES PRODUCED BY PRESSURE BREATHING] Estudios sobre las variaciones circulatorias producidas

por la respiración a presión. — Revista de aeronáutica (Madrid), no. 155: 796-801. Oct. 1953. In Spanish.
DLC (TL504.R516, no. 155)

By means of a cannula inserted into the trachea, anesthetized dogs breathed pure oxygen under pressure. The following effects were observed: (1) decrease in arterial blood pressure; (2) expansion of the thorax in all three directions; (3) lowering of the diaphragm and elongation of the heart; (4) tachycardia; and (5) increase in potential of the auricular P-wave. These effects were alleviated when a pressure vest was worn. Complete protection, however, could only be attained when a pressure suit, covering the extremities was worn.

3190
Merklen, L. 1953
[THE PHYSICAL TRAINING OF FLYING PERSONNEL: RECENT ACCOMPLISHMENTS] L'entrainement physique du personnel navigant: réalisations récentes. — Forces aériennes françaises (Paris), no. 81: 320-330. June 1953. In French
DLC (UG635.F8F66, no. 81)

Developments in the realization of the athletic training program for airmen suggested by Grandpierre and Lehalle in 1946 are discussed. The suggestion resulted, in 1950, in the formation of the annual six-week "Studies in Aeronautical Improvement of the Athletic Coaches of the Air Corps", given at Nancy. The principal areas of training presented in this course are: (1) instruction of aviators in the development of resistance to temperature and anoxia; (2) physical and psychological training, including the development of the nervous, respiratory, and circulatory systems, and furthering of group spirit; (3) judo; and (4) massage.

3191
Merrick, A. W.
CARDIAC GLYCOGEN FOLLOWING FULMINATING ANOXIA. — Amer. Jour. Physiol., 176 (1): 83-85. Jan. 1954. DLC (QP1.A5, v. 176)

In normal goldfish cardiac glycogen averaged 2325 mg. per 100 gm. of cardiac tissue. This is the highest normal value yet reported for any vertebrate. Anoxic and recovery experiments suggest that the high resistance of the goldfish to anoxia may be associated with the high glycogen content of the heart. No significant correlations between body length, body weight, heart weight, or sex with amount of cardiac glycogen were found. Complete removal of cardiac glycogen is not a prerequisite to the failure of the respiratory and cardiovascular mechanisms during fulminating anoxia. In terms of total cardiac glycogen found in the controls, that of the fishes recovering from fulminating anoxia returned to approximately the 50% level during the first 3 hours of recovery and to approximately the 85% level by the end of the sixth hour of recovery. The experiments collectively support the belief that cardiac glycogen is ar emergency stand-by used by the heart during periods of anoxic stress.

3192
Merton, P. A.
VOLUNTARY STRENGTH AND FATIGUE. — Jour. Physiol. (London), 123 (3): 553-564. March 29, 1954.
DLC (QP1.J75, v. 123)

Using the adductor muscle of the thumb and special apparatus, voluntary tension was compared directly with tension resulting from electrically excited motor volleys, and the two were found equal. This equality was found to persist during fatigue, implying that in fatigue, too, the limitation of strength is peripheral. Neuromuscular block is not important in the fatigue of a volitional tetanus. Even in extreme fatigue, action potentials evoked by nerve stimulation are not significantly diminished. Experiments with occluded circulation also show that fatigue is peripheral; if it were central, recovery should occur when effort ceases, for

there is no interference with the circulation to central structures. But no strength returns until blood is returned to the hand.

3193
Mestyán, G.
ADRENAL ASCORBIC ACID CONTENT OF NORMAL, THYROIDECTOMIZED AND METHYLTHIOURACIL TREATED RATS EXPOSED TO HIGH AND LOW ENVIRONMENTAL TEMPERATURES. — Acta physiologica (Budapest), 6 (4): 403-407. 1954. In English. DNLM

The adrenal ascorbic acid content in normal rats exposed to heat is markedly reduced, the rate of reduction increasing with the rise in environmental temperature. Thyroidectomized and methylthiouracil-treated rats exposed to high temperatures failed to elicit a response in the pituitary-adrenal system. An increase in the metabolic rate was noted however. A similar response obtained in these rats upon exposure to cold excludes the possibility of a general disturbance in pituitary-adrenal function and suggests that the mechanism responsible for the failure is at a supra-pituitary level. The responses to cold and heat indicate that by changes in central nervous system function, some stimuli may fail to elicit a response in the adrenal-pituitary system while closely related stimuli may retain their full effect. (Author's summary and conclusions, modified)

3194
Metz, B.,
and M. F. Mours-Laroche
[COVARIATION OF WATER AND CHLORINE BALANCE DURING NYCTHEMERAL RHYTHM IN MAN Covariation des bilans d'eau et de chlore au cours du rythme nycthéméral chez l'homme. — Journal de physiologie (Paris), 46 (1): 464-470. 1954. In French. DNLM

The simultaneous study of body water and chlorine balance, hydremia, and blood chlorine levels in 4 normal young men during 16 experimental cycles showed that (1) there exists a nychthemeral rhythm of water and chlorine balance (statistically proven); (2) there is no statistically significant manifestation of the rhythm of hydremia or blood chlorine; (3) there is no relation between the variations of hydremia and water equilibrium, and (4) there is a highly significant linear relation between water and chlorine balance, a relation permitting the approximate calculation of the chlorine concentration in solutions lost or retained by the body. (Authors' summary)

3195
Meurers, J. 1953
[A PSYCHOPHYSICAL EFFECT DURING ANALYSIS OF DOT OR STAR CLUSTERS] Ein psycho-physischer Effekt bei der Untersuchung von Punkt- und Sternfeldern. — Psychologische Forschung (Berlin), 24 (2): 133-142. 1953. In German.
DLC (BF3.P65, v. 24)

In the observation of photographs of the night sky or of any dark field containing randomly distributed dots, the observer perceives an apparent arrangement of dots into more or less defined directional patterns. A series of investigations revealed that structural analysis of dot patterns by direct observation is subject to influence by the following three factors: (1) boundaries enclosing the field, (2) the "line of position" (Standlinie), which is a line horizontal in respect to the observer, and (3) the "eye line" (Augenlinie), parallel to the line connecting the two eyes. The latter was recognized as the most influential in imposing an apparent direction, while the first had the least effect. A new method for the structural analysis of star photographs was developed, eliminating the above-named factors.

3196
Meyer, M. F.
AUDITORY FATIGUE BEYOND AND WITHIN THE COMPASS OF THE

VOICE. — Amer. Jour. Psychol. 67 (3): 538-543. Sept. 1954.
DLC (BF1.A5, v. 67)

A theoretical explanation is presented of auditory fatigue, on the basis of experimental data supplied by Dr. Yutaka Onchi (Japan). The data indicate that, when auditory fatigue is produced with a stimulus frequency that lies considerably beyond the compass of the voice, the maximal effect is noticeably shifted from the stimulus frequency upwards. The author proposes a hydraulic conception of cochlea mechanics to explain this effect. For auditory stimuli within the compass of the human voice, fatigue (threshold rise) is of an electrochemical nature. However, the auditory fatigue resulting from stimuli outside the voice range is supposed to be a compound of the symmetrical curve of true auditory fatigue and the unsymmetrical curve of the mechanical hindrance resulting from the inflammation of the phragma with its reduction of flexibility. The bruising of the phragma is not relieved as quickly as the electrochemical loss of sensitivity.

3197
Mezey, K.,
and A. Staffe
[CATALASE AND ALTITUDE] Catalasa y altura. — Anales de la Sociedad de biología de Bogotá, 6 (3): 94-108. Feb. 1954. In Spanish, with English summary (p. 108). DNLM

Blood catalase levels of humans and rabbits living in Bogotá, Colombia (2,640 meters above sea level) are 60% higher than in persons living at Girardot, Colombia (326 meters above sea level). This change cannot be related to blood O_2 content or to the number or erythrocytes. It is suggested that a catalase-inhibitor is active at low altitudes and inactive at altitude. It is also noted that blood catalase content increases during aircraft takeoff and decreases upon landing. These changes appear suddenly.

3198
Mickle, W. A., 1952
and H. W. Ades
A COMPOSITE SENSORY PROJECTION AREA IN THE CEREBRAL CORTEX OF THE CAT. — Emory Univ., Atlanta, Ga. (Contract N9onr-89800, Project no. NR140-916); issued by Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. NM 001 066.01.03, Oct. 23, 1952. 13 p.
UNCLASSIFIED

Projection of the auditory, vestibular and a part of the somatic system has been shown to overlap extensively in a small cortical area in the cat, comprising the inferior portions of the anterior ectosylvian and suprasylvian gyri and the compositive gyrus. The responses to each mode of stimulation occur with latencies which suggest that their projection is direct from thalamic relay nuclei. The projection to this area of several sense modalities which have in common their relation to posture and spatial orientation suggest the possibility of a primary cortical area of correlation. (Authors' summary)

3199
Mickle, W. A., 1952
H. W. Ades
SPREAD OF EVOKED CORTICAL POTENTIALS. — Emory Univ., Georgia (Contract N9onr-87800); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NR140-916). Oct. 14, 1952. 32 p. AD 1008 UNCLASSIFIED

Latency and action potentials induced in the cat's auditory cortex by click stimulation demonstrate a regular pattern. For about 6 msec. no evoked activity is detected, but about this time a positive potential appears in the anterior suprasylvian gyrus, and at subsequent msec. intervals wider areas show this potential change. About 9 msec. after stimulation, most of the ectosylvian gyri develop a negative potential which is interrupted one or two msec. later by a change towards

positivity in one or more areas near the middle of the auditory area. In subsequent msec., wider areas show similar change, producing an expanding pattern of positive potential which fades away at the auditory border. Bipolar recording demonstrates similar expanding patterns. The expanding wave travels distances up to 10mm. radially from the original site at rates up to 1.5 meters per second. It is suggested that the negative component in the ectosylvian gyri originates from diffusely projecting subcortical auditory centers and that the positive component represents transcortical propagation. (Authors' summary and conclusions, modified)

3200
Mickle, W. A., 1953
and H. W. Ades
ROSTRAL PROJECTION PATHWAY OF THE VESTIBULAR SYSTEM. — Emory Univ., Georgia (Contract N9onr-87800); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project no. NR140-916). Project Report no. NM 001 066.01.04, Aug. 25, 1953. 6 + 4 p. AD 19 767
UNCLASSIFIED

Electrical stimulation of the vestibular nerve in cats evoked neural activity traceable to the cerebral cortex. Recordings from the vestibular nuclei, midbrain, thalamus, and cortex revealed that cortical projection is achieved through second order neurons which decussate in the trapezoid region and take up a position between the lateral and medial lemnisci, ending in the thalamus near the boundaries of the medial geniculate body and posterolateral ventral nucleus. Third order neurons then project to the posterior bank of the anterior suprasylvian gyrus. In general, the route of projection appears to consist of small and diffuse fibrous groups which are difficult to identify in degeneration experiments. (Authors' summary, modified)

3201
Milch, L. J.,
R. F. Redmond, and W. W. Calhoun
THE BIOCHEMISTRY OF TISSUE TRAUMA. V. A PROLONGED HYPERLIPEMIA IN RABBITS SUBJECTED TO REPEATED TRAUMATIC INJURY. — School of Aviation Medicine, Randolph Field, Tex. April 1954. iii+4 p. (Project no. 21-1601-0017, Report no. 5). AD 31 151 PB 114275

A prolonged hyperlipemia and hyperlipoproteinemia were induced and maintained in rabbits by repeated traumatic injury. Blood lipid increases were accompanied by a significant anemia and decreased plasma and serum inorganic ion levels but no significant changes in aortal or kidney tissue lipid concentrations. The apparent failure of the sensitive tissues to imbibe lipids in the presence of a lipemia was noted, but such result was not conclusive in view of the pronounced undernutrition observed in the traumatized animals at autopsy. (Authors' summary)

3202
Milch, L. J.,
R. F. Redmond, and W. W. Calhoun
BLOOD LIPOPROTEINS IN TRAUMATIC INJURY. — Jour. Lab. and Clinical Med., 43 (4): 603-614. April 1954. DLC (R11.J695, v. 43)

Rabbits were separately subjected to local injury by heat, crushing, ischemia, and radiation. It was demonstrated that blood plasma lipoprotein concentration was markedly increased by each type of traumatic episode. There was an indication that lowered plasma calcium ion levels also followed traumatic injury. Repeated injury to the same animal over an eight-week period was associated with prolonged hyperlipoproteinemia in rabbits. The lipoprotein response to trauma could not be accounted for on the basis of tissue ischemia, but the increased plasma lipoprotein levels were found to be associated with a concomitant increase of cholesterol

concentration in the injured tissue. Heparin administration to injured rabbits markedly altered the qualitative pattern of hyperlipoproteinemia, resulting in a marked shift toward lipoproteins of highest density. No effect of adenosine-5-monophosphate on the hyperlipoproteinemia of traumatic injury could be recorded, but eight days of adenosine-5-monophosphate administration to normolipemic rabbits decreased significantly the plasma lipid and lipoprotein components measured. (Authors' summary)

3203
Milch, L. J.
MILITARY ASPECTS OF CORONARY ARTERY DISEASE. – Military Surgeon, 114 (5): 333-342. May 1954.
DLC (RD1.A7, v. 114)

The strategic implications of cardiovascular disease and its effects on national defense are reviewed, in order to demonstrate the requirement for a test system that would measure the extent of arterial atherosclerosis and identify those individuals with an extraordinary predisposition to early coronary arterial disease. In a preliminary experiment involving some 300 military personnel, the ultracentrifugal determination of blood lipoproteins was shown to demonstrate some promise as a satisfactory test system. A long-term experiment utilizing West Point cadets was established to estimate the validity of blood lipoprotein measurements as a predictive parameter in identifying individuals prone to early coronary artery disease. Traumatic injury, a military occupational hazard, was shown to result in altered lipid metabolism in rabbits. This defect in lipid metabolism is very similar to that observed in coronary artery disease. (Author's summary)

3204
Miller, A. T. 1952
INFLUENCE OF OXYGEN ADMINISTRATION ON CARDIOVASCULAR FUNCTION DURING EXERCISE AND RECOVERY. – Jour. Applied Physiol., 5 (4): 165-168. Oct. 1952.
DLC (QP1.J72, v. 5)

The influence of oxygen administration before, during and after exercise on heart rate, blood pressure, blood lactate, endurance and subjective impressions has been studied. The administration of oxygen before exercise was without effect on the magnitude of these changes during exercise and recovery. Similarly, recovery was not hastened by the administration of oxygen during the recovery period. When oxygen was given during the exercise, heart rate and blood pressure changes were not affected, but there was a small but significant decrease in maximal blood lactate concentration, and an increase in time required to produce exhaustion. It is concluded that inadequate oxygenation of blood in the lungs is of minor importance in determining capacity for exercise and rate of recovery from exercise. (Author's summary)

3205
Miller, I.
AUDITORY PERCEPTION IN RELATION TO AMOUNT OF INFORMATION AND SPEECH-TO-NOISE RATIO. – (Thesis, Purdue Univ., Lafayette, Indiana) 50 p. Ann Arbor: University Microfilms, 1954.
DLC (Microfilm AC-1, no. 9880)

A study was made of auditory perception in relation to the degree of organization of speech stimuli and the speech-to-noise ratio (S/N). The organization of the speech stimuli was quantified in terms of logarithmic units of information (I). The following conclusions were reached after statistical analysis of the data: (1) the number of nonsense items correctly reproduced varied inversely with I. (2) The number of nonsense items reproduced varied directly with S/N. (3) A significant interaction was found between I and S/N, qualifying their effects upon the mean number of items correct. Differences in terms of the I

variable were slight when S/N was high, but increased significantly as S/N was decreased. (From the author's abstract)

3206
Miller, J. W.,
and S. H. Bartley
A STUDY OF OBJECT SHAPE AS INFLUENCED BY INSTRUMENTAL MAGNIFICATION. — Jour. Gen. Psychol. 50 (1): 141-146. Jan. 1954.
DLC (BF1.J64, v. 50)

Experimentally it has been noted that there is a geometrical difference between an enlarged retinal image by means of instrumental magnification and an image enlarged by bringing the object closer to the eye; i.e., a cube viewed through a binocular appears to be diamond shaped. The observed change consists in reduction of the three dimensional aspects of the object. This experiment investigates whether a tilted plane figure (two-dimensional, though occupying three dimensions with reference to the observer) undergoes a change of shape (reduction of the third dimension) when viewed through a two-power binocular. A series of plane targets in four positions were presented to four observers under two viewing conditions: (1) the targets (consisting of a circle and five ellipses) were viewed with the unaided eye; and (2) the observers used a two-power binocular mounted in a fixed position. Results showed that phenomenal regression was almost wholly excluded with instrumental magnification, so that in every case the ellipse was seen thinner when viewed with a binocular. The authors concluded, that the third dimension is reduced in tilted plane figures when viewed at instrumental magnification.

3207
Miller, R. B.,
J. D. Folley, Phillip R. Smith, and A. D. Swain
SURVEY OF HUMAN ENGINEERING NEEDS IN MAINTENANCE OF GROUND ELECTRONICS EQUIPMENT. — American Inst. for Research, Pittsburgh, Pa. Final Report of the Project, Major Human Engineering Problems in the Design of Radar and Communication Equipment, Feb. 1954. vii+274+28 p. (Contract AF 30(602)24). AD 27 809 PB 116376

Verbal and written questionnaires were administered to all available Air Force maintenance personnel at six locations. The following problem areas were identified: accessibility, presentation of technical information, test equipment, working conditions, environmental effects, safety, component size, power problems, color coding of equipment, warning indicators, cable connectors, panel controls and meters, circuit-switching arrangement, preventive maintenance, trouble shooting, and supply. The study indicated that maintenance should be regarded as a system in which checks, check points, testing equipment, trouble-shooting procedures, circuit codes, component packaging, and the environmental and human limitations in the field are recognized as interlocking factors in the development of a specific equipment. (AD abstract)

3208
Mills, C. A.
VITAMIN REQUIREMENTS IN HOT CLIMATES. — In: Spector, H. and M. S. Peterson, (ed.), Nutrition under climatic stress..., p. 54-62; discussion, p. 66-69. Nat. Acad. of Sci.—Nat. Research Council and Advisory Board on Quartermaster Research and Development. Washington, D. C., May 1954. AD 67 453 PB 117996

The relative adequacy of various vitamin concentrations in the diet was studied in animals kept at 91° F. and at 68° F., respectively. The findings indicate that the thiamine in the diet required for optimal growth in a hot climate is twice as high as that needed for optimal growth in a temperate climate. With advancing age and lowering

of metabolism the thiamine requirement rises steadily in both climates, still maintaining the same relationship. A similar hot-cold relationship was found for thiamine needed to prevent acute deficiency symptoms at all ages in both climates. For optimal phagocytosis the amount of dietary thiamine was two to four times greater than that needed for optimal growth in the same climate. Five times more dietary choline was required for optimal growth and phagocytosis under hot environmental conditions. The vitamin K requirement was similarly increased in the tropical environment. It is concluded that supplemental thiamine and choline is indicated for optimal nutrition performance and heat tolerance in a hot environment.

3209
Missiuro, W., 1953
S. Koztowski, and I. Wojcieszak
[EFFECT OF SOCIAL ENVIRONMENTAL STIMULI ON VEGETATIVE FUNCTIONS AND ON WORK CAPACITY] Wpływ środowiskowych bodźców natury społecznej na funkcje wegetatywne i zdolność do wysiłku fizycznego. — Acta physiologica Polonica (Warszawa), 4 (3): 207-218. 1953. In Polish, with English summary (p. 217-218) DNLM

Work capacity and several autonomous functions of 24 persons were compared when working alone and working in the presence of another person doing identical work. The presence of another person increased the work capacity. If this presence was associated with other stimuli (i.e. buzzer sound), these stimuli alone had a similar, but only temporary, effect. Blood lactic acid, pulmonary ventilation, and pulse rate were increased after a period of increased work capacity. A decline of work capacity and of other functional reactions was observed only in excessively emotional states.

3210
Mitchell, H. H.
LABORATORY STUDIES. — In: Spector, H. and M. S. Peterson (ed.), Nutrition under climatic stress..., p. 108-129; discussion, p. 165-167. Nat. Acad. of Sci. — Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 PB 117996

A review of experiments with human subjects reveals the profound effects of climatic stress on nutrient requirements, but only with reference to food energy, water, and a few of the nutrients lost through sweat. The flexibility of the human body in its physiological functioning is shown in the processes of acclimatization which ameliorate the impacts of climatic stress, particularly heat stress. By modifying his diet man may instinctively, or deliberately, increase his tolerance to cold; whether the tolerance to heat may be similarly improved is not so clear. It is well to point out, however, that this effect of diet composition on tolerance to cold has been demonstrated only by extreme distortions in the proportions normally existing among the organic nutrients in the American diet. (Author's conclusions, modified)

3211
Mitchell, H. H.
LABORATORY STUDIES ON MAN. — In: Spector, H. and M. S. Peterson, (ed.), Nutrition under climatic stress ..., p. 191-193; discussion, p. 200-203. Nat. Acad. of Sci. — Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 UNCLASSIFIED

Based on the hypothesis that the output of vitamins in urine is to be considered a "spill-over" phenomenon permitting the body to get rid of what it does not need, the author suggests an experimental design for investigating vitamin requirements of man under cold stress.

3212 1953
Mitchell, R. B.,
J. D. Fulton, and D. E. Timmons
SEASONAL VARIATIONS IN THE MICROORGANISM CONTENT OF AIR AT 2,000 FEET OVER THE BRYAN-WACO, TEXAS, AREA. — School of Aviation Medicine, Randolph Field, Tex. Feb. 1953. iii + 8 p. (Project no. 21-5501-0001, Report no. 3). AD 9419 UNCLASSIFIED

Total microorganism counts were determined for 111 samples collected at 2,000 feet altitude over the Bryan-Waco, Texas, area. The peak of increased counts of air-borne microorganisms was closely associated with the seasons of the year during which comparable increases in the soil-microorganism counts were found. The normally occurring air-borne microorganisms are primarily common soil types indigenous to the top soil layers of the geographic locations traversed by air masses. It is noted that knowledge of the distribution of the numbers and types of airborne microorganisms at altitude throughout the seasons is required in order to establish the normal air-borne microorganism background. (From the authors' summary and conclusions)

3213
Miyamura, Y.,
and Y. Doi
(FATIGUE RECOVERY TESTS CONDUCTED ON STUDENT PILOTS OF THE NATIONAL SAFETY FORCE AVIATION SCHOOL BY ADMINISTERING THE COMPOUND AMINO ACID PREPARATION, F-MIN (Report no. 1)). — Japanese Safety Forces Med. Jour. (Tokyo), 1 (7): 3-5. Sept. 1954. In Japanese, with English summary (p. 5). DNLM (W1H0455, v. 1)

Results of experiments conducted to determine the preventive and rehabilitative effects of "F-Min" (6 mg. amino acid/tablet) on pilot fatigue are presented. Five tablets of "F-Min" were given twice daily for one month. Urine specimens were collected and tested by the copper ferrocyanide colloidal agglutination reaction. Moderate fatigue was noted in both experimental and control subjects in the initial test, slight fatigue in the second test, and no fatigue among the group receiving the drug, with only slight fatigue among the control group on the third test. A comparison between the two groups was made difficult by the greater weight of the control group, and by weight fluctuations. While slight effectiveness of the drug was subjectively noted, no definite conclusions were drawn, since the difference between the two groups was not sufficiently significant. (Authors' summary, modified)

3214
Monge, C.
[MAN, CLIMATE, AND CHANGE OF ALTITUDE: RECENT STUDIES ON BIOCLIMATOLOGY] Hombre, clima y cambios de altitud: estudios recientes en bioclimatología. — Anales de la Facultad de medicina (Lima), 37 (3): 459-485. 1954. In Spanish. DNLM

Bioclimatological studies were made on persons living at high altitudes in Montaña, Peru. The process of acclimatization in persons living in the Andes is reviewed, and the physiopathological aspects of high-altitude hypoxia which leads to altitude sickness in persons previously living at sea level are discussed. In addition, the effects of atmospheric hypoxia on persons adapted to high altitudes are noted along with the physiological manifestations (cardiac, pulmonary, hematological) in these persons upon their return to sea level. They show a marked physical deficiency and a predisposition to pathological respiratory processes. It is concluded that climatic aggression in acclimatized man leads to the loss of his acclimatization and ultimately to altitude sickness.

3215
Monteiro, A. R. de Castro
[OCCUPATIONAL DEAFNESS IN FLIGHT RADIO-TELEGRAPHERS]

Surdez profissional em rádio-telegrafista de vôo. — Revista brasileira de oto-rino-laringologia (Rio de Janeiro), 22 (2): 139-151. March-April 1954. In Portuguese. DNLM
Translation in: Jour. Aviation Med., 25 (5): 476-484. Oct. 1954.
DLC (TL555.A1A4, v. 25)

Comparative audiometric observations were made on four groups of subjects: (1) radio-telegraphers with more than 5 years of service and more than 5,000 flying hours, (2) radio-telegraphers with less than 5 years of service or 50,000 flying hours, (3) radio-telegraphy candidates, and (4) commercial pilots. From the observed results and considerations, the author concludes that radio noise does not cause professional deafness, and, furthermore, that the noise of the airplane engine is a great factor in increasing the deafness of the radio-telegraphers. (Author's summary, translated and modified)

3216 1953
Mookerjee, G. C.,
and B. K. Ghose
LIFE IN COLD AND ALTITUDE: SOME OBSERVATIONS. — Jour. Army Med. Corps (Poona, India), 9 (1): 1-11. Jan. 1953. DNLM (W1.IN119, v. 9)

Observations are presented on some of the physiological changes taking place during exposure to a typical cold winter in the Himalayan ranges of India at altitudes between 6,800 and 11,000 ft. The medical and physiological problems covered include body temperature, respiration at altitude, hematological changes, cardiovascular reserve, nutrition and caloric requirements, body weight changes during residence at altitude, as well as basal metabolism and metabolism during work. Criteria for selecting suitable subjects for service at high altitude were centered around these four factors: (1) low basal pulse rates, (2) difference between standing and lying pulse rate less than 20 beats per min., (3) normal blood pressure, and (4) a high Harvard Pact Test score.

3217
Mookerjee, M. D.,
and R. N. Sharma
ACCLIMATIZATION TO HEAT AND TROPICAL FATIGUE AMONG AIR FORCE PERSONNEL. — Aero Med. Soc. Jour. (New Delhi), 1 (1): 44-49. April 1954. DNLM

Heat acclimatization was studied on Indian Air Force personnel engaged in indoor and flight activities. Investigations showed that measurements of skin temperature, oral temperature, pulse rate, and blood pressure changes do not provide an index of heat stress under field conditions. In the tropics, low blood pressure needs fuller study on a large number of subjects, especially in those exposed to the outdoor sun. Hourly water loss may be as high as 31 oz. per man, i.e., 15.5 lbs. per 8-hour duty shifts, even in sedentary persons (with sitting metabolic rate). It is doubtful whether many individuals are in the habit of drinking equivalently large quantities of liquid. The lack of water supply leads to dehydration and elevation of pulse rate. It may also give rise to a variety of vague symptoms of tropical exhaustion associated with dehydration. The need of supplying salt with water should also be stressed, as ingestion of such large quantities of water without salt leads to salt deficiency syndromes.

3218
Mookerjee, M. K.,
and S. K. Dasgupta
VARIATION OF BLOOD GLUCOSE IN MAN AT SIMULATED ALTITUDES BETWEEN 10,000 FT. AND 30,000 FT. IN DECOMPRESSION CHAMBER. — Aero Med. Soc. Jour. (New Delhi), 1 (2): 37-40. Oct. 1954. DNLM

The object of this investigation was to assess the influence of reduced barometric pressure on blood glucose levels and to correlate the variations of blood glucose levels, if any, with the onset of

flying fatigue at altitudes between 10,000 ft. and 30,000 ft. Blood sugar determinations were made on four subjects after breakfast, every half hour for 2 1/2 hours at ground level. Further observations were carried out at altitudes of 5,000 ft., 10,000 ft., 15,000 ft., at the base on arrival, and at the base after 1/2 hour. Twelve subjects were exposed to simulated altitudes from 15,000 to 30,000 ft. Glucose tolerance tests were carried out on six subjects at ground level and compared with blood sugar levels at 20,000 ft. and at 25,000 ft. on the subsequent day. An analysis of the results showed wide individual variations of blood sugar levels; but in none of the individuals the blood sugar levels indicated hypo- or hyperglycemia. A comparison of tolerance curves showed that return of blood sugar levels to pre-ingestion values occurred at approximately the same time, both on the ground and at simulated altitudes. It was concluded that there was no significant change from ground level conditions in the blood sugar levels of resting human subjects maintained at simulated altitudes between 10,000 ft. to 30,000 ft. if oxygen was used.

3219 1953
Morehouse, L. E.,
and A. T. Miller
PHYSIOLOGY OF EXERCISE. — 355 p. St. Louis: C. V. Mosby Co., 1953.
DLC (QP301.M65)

A comprehensive description of the physiology of muscle activity is presented. The following topics are included: heart function, respiration, and circulation during exercise; functional aspects of exercise such as endurance, skill and mechanics of muscle action; and conditional effects, including training, diet, physical characteristics, and environment (particularly heat). (458 ref.)

3220
Morehouse, L. E.,
and E. M. Prange
EFFECTS OF RECUPERATIVE PROCEDURES ON WORK PERFORMANCE. — Federation Proceedings, 13 (1^{I}): 102. March 1954.
DLC (QH301.F37, v. 13)

A pursuitmeter-ergograph was designed which demanded both physical and mental exertion. Twenty-one men aged 19 to 33 worked for 15 min., rested 2 min., again worked until 20 errors were made, recuperated for 10 min., and then finally worked until again 20 errors were made. Experimental recuperative procedures employed during the 10-min. interval before the last bout of work were (1) ice pack on abdomen, (2) hot shower, (3) mild exercise, and (4) 150 cc. of 100-proof whiskey. Recuperation while sitting quietly was employed as the 1st and last procedure in all subjects and the order of the 4 experimental procedures was randomized. Heart rate, body temperature, and work time were recorded immediately following each bout of work. Feeling-tone scale scores and comments from the subjects were recorded after each experiment. Subjects worked longer (accumulated errors less rapidly) following the hot shower and the whiskey regimes. Also, subjects reported that they felt more relaxed during work following the hot shower and whiskey procedures. Feeling tone was lowest following ice pack application to the abdomen. The relations of heart rates and body temperatures immediately following work to the various recuperative procedures were statistically insignificant. (From the authors' summary)

3221
Morelli, A., 1953
and P. Preziosi
[OCCUPATIONAL POISONING IN THE FIELD OF AVIATION] Intossicazioni professionali in campo aeronautico. — Folia medica (Napoli), 36 (9): 729-761. Sept. 1953. In Italian. DNLM

A review is presented of the substances causing poisoning in flight personnel. Over 150 items are listed including CO, CO_2, benzene, alcohols,

halogenated hydrocarbons, and other organic and inorganic compounds. In addition, the etiopathogenic aspects and symptomatology of poisoning are presented along with measures for diagnosis, prevention, and therapy.

3222
Morgan, R. L.,
G. A. Eckstrand, and M. R. Rockway
VERBALLY MEDIATED TRANSFER AS A FUNCTION OF ORDER OF TASKS. — Ohio State Univ., Columbus (Contract AF 18(600)-78); and Wright Air Development Center. Aero-Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-41, Feb. 1954. iv+18 p. (RDO no. 694-44). AD 33 353
UNCLASSIFIED

Eight groups of subjects, four experimental (E) and four control (C), received practice on three training tasks prior to being tested on the same final task. The training tasks were identical for all E groups, but the order in which they were experienced differed. Four orders of tasks were studied — positive transfer was predicted for two of the orders (E_1 and E_3), while zero transfer was predicted for the other two (E_2 and E_4). When tested on the final task, significant amounts of positive transfer were displayed by E_1, E_2, and E_3, and "zero" transfer by E_4. An attempt was made to reconcile the results with Hull's theory of "mediated stimulus equivalence" by invoking a seemingly reasonable relationship between level of learning and "real" order of tasks. (Authors' abstract)

3223
Moriarty, J. D.
PSYCHIATRIC PROBLEMS IN AGING, WITH REFERENCE TO AERO MEDICINE. — Jour. Aviation Med., 25 (3): 221-226. June 1954.
DLC (TL555.A1A4, v. 25)

Psychiatric problems of aging involve chronological age, mental age, physical age, and particularly the emotional age of individuals. Together these "ages" reflect the functional age. Great emphasis is placed upon the desirability of youth in our culture; this is a reflection of emotional immaturity in our society, one of the causal factors being maternal overprotection. Another factor is the high degree of technologic development in our civilization which the human nervous system has difficulty in meeting, leading at times to regression to earlier levels of adaptation. Illustrative cases concerning aviation personnel are given which show the need for a suitable transition for the older pilots to jobs requiring judgement, maturity, and experience, but less active participation in arduous flying chores. A well defined plan for retirement at a suitable age is also needed.

3224
Morin, R. E.,
D. A. Grant, and C. O. Nystrom
TEMPORAL PREDICTIONS OF MOTION INFERRED FROM INTERMITTENTLY VIEWED LIGHT STIMULI. — Univ. of Wisconsin, Madison (Contract AF 18(600)-54); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-69, Jan. 1954. iv + 14 p. (RDO no. 694-49). AD-37 703 PB 133513

The accuracy of predicting when a moving object will reach a target was studied for the following procedure: no real movement occurred, but the subject viewed the successive illumination of 2 or 4 cue lights placed at even intervals in a horizontal row. Illumination of the cue lights represented momentary viewings of a moving object as seen on a radar scope. After the illumination of the last cue light, the time it would take the imaginary object to reach a target light was estimated by a button being pressed at the moment of predicted arrival. The accuracy of the estimations was studied as a function of the following: (a) 2 computed object velocities, 0.10

and 0.05 ft./sec.; (b) sweep times or intervals between onsets of successive cue lights of 8 and 4 sec.; (c) 2 numbers of cue lights, either 2 or 4; and (d) 2 distances for the target or destination light, either 2 or 4 ft. from the last cue light. Computer object velocity produced the greatest effect upon the accuracy of estimations. Underestimations occurred at 0.05 ft./sec. The distance of the target or destination lights from the last illuminated cue light produced highly significant effects. Sweep time, or the temporal interval between cue lights, and the number of cue lights were less important. Temporal estimations were more accurate following long-interval sweep times and were more accurate following 4 cues than following 2 cue lights. (AD abstract)

3225
Morrison, N. K.,
and L. A. Schafer
GROUND STUDY OF THE NONEJECTION METHODS OF ESCAPE FROM B-47B AIRCRAFT. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-6, April 1954. v+16 p. (SEO no. 426-278). AD 30 282 UNCLASSIFIED

This study, done at the Wright-Patterson Air Force Base, led to the establishment of optimum procedures to be followed by each man when leaving his station and reaching the possible escape exits, and the most feasible body positions for leaving the aircraft (B-47B). Time studies of crew evacuations conducted at Lockbourne Air Force Base, utilizing the procedures presented in this report, covered crew escape through the ventral hatch, with and without the use of an escape bracket, and through the crawlway to the bomb bay. Analysis of the data thus accumulated indicates that the optimum method on nonejection escape from this aircraft is through the ventral hatch in a feet-first, facing-aft position utilizing the Barto escape bracket. It must be stressed that the data are based on the tests made with the aircraft on the ground and in the absence of factors that would cause a flight emergency necessitating bailout. (Authors' abstract, modified)

3226
Moseley, H. G.
FIT TO FLY. — Flying Safety, 10 (5): 6-8. May 1954. DLC

Two cases of aircraft accidents are reported, one of them fatal. In the first case, the pilot ignored or hid a symptom indicative of heart disease, which might have grounded him if it had come to the attention of the flight surgeon before the fatal accident. In the other accident, the pilot was suffering from a cold and carbon monoxide poisoning, hypnotic effects of self-treatment with antihistaminics, and, in addition, had a leaking oxygen mask when he took off on a high-altitude flight. Both accidents could have been prevented if the individuals had consulted the flight surgeon upon noticing symptoms, instead of self-appraisal and self-treatment.

3227
Mote, F. A.,
W. R. Biersdorf, G. W. Kent, and
J. Myers
VISUAL CONTRAST DISCRIMINATION AS A FUNCTION OF PRE-EXPOSURE TO LIGHT. — Univ. of Wisconsin, Madison (Contract AF 18(600)-54); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-80, Feb. 1954. iv+12 p. (RDO no. 694-49). AD 33 356 UNCLASSIFIED

The just discriminable brightness contrast was measured for 12 subjects (six using the natural pupils, six with 2-mm. artificial pupils) at three values of target luminance following preexposure to a constant intensity for three durations. The duration of preexposure had little effect upon contrast sensitivity when the highest target

luminance was used. At the middle value of target luminance, the longer the pre-exposure the higher the contrast threshold upon termination of pre-exposure and the slower the recovery of maximum sensitivity. When the lowest target luminance was used (a value near the dark-adapted threshold for the fovea), the effect of pre-exposure was marked. For all durations, when artificial pupils were used, the initial threshold following pre-exposure was high and the speed of recovery depended upon the duration; the longer the duration, the slower the speed. When natural pupils were used, the initial threshold contrast ratio was about 0.3 and recovery of maximum sensitivity was rapid. At the two longer durations there was a delay of the order of 15-50 seconds before an initial setting could be made at maximum contrast (0.53) and the recovery of maximum sensitivity was greatly retarded. (Authors' abstract)

3228
Motulsky, A. G.
SICKLEMIA. — Jour. Amer. Med. Assoc., 155 (4): 388. May 22, 1954.
DLC (R15.A48, v. 155)

This letter to the editor refers to the paper by J. C. Cooley, et al. (item no. 2611), wherein massive splenic infarction following high-altitude flight is associated with the sickling trait. The letter suggests that it is probable that four of the six patients described by Cooley did not have the usually benign sickling trait, but were affected by one of the more severe varieties of the sicklemia syndrome, such as true sickle cell anemia or sickling-hemoglobin C disease. It is difficult to differentiate between the sickle cell trait and sickling-hemoglobin C disease, clinically or experimentally, other than by paper electrophoresis. It is recommended that every effort should be made by all who may have the opportunity to see similar cases to have the hemoglobin examined by simple paper electrophoresis in order to accurately establish the variety of sicklemia. Such studies would settle the point of whether patients with sickling traits should be excluded from military high altitude flying. They would further help to clarify the problems of sudden death due to sickling in the cerebrum and essential hematuria in sicklemia, which has also been stated to occur with the sickling trait.

3229
Moulierac, L.,
and J. Sais
[THE ROLE OF STATIC MUSCULAR WORK IN FATIGUE OF THE FIGHTER PILOT: ATTEMPTED DETERMINATION OF MUSCULAR FATIGUE BY DONAGGIO'S REACTION] Importance du travail musculaire statique dans la fatigue du pilote de chasse; essai de dosage de la fatigue musculaire par la réaction de Donaggio. — Médecine aéronautique (Paris), 9 (2): 145-152. 1954. In French.
DLC (TL555.M394, v. 9)

Static muscular exertion is a major cause of fatigue in fighter pilots and is largely determined by postural factors, such as the pilot's seating position, as well as by external factors such as acceleration. Donaggio's reaction (precipitation of thionine in the presence of ammonium molybdate in a urinary specimen) is recommended for the determination of the degree of fatigue following muscular work. In spite of the very limited number of case studies conducted so far, it could be established by this method that the degree of muscular fatigue (e.g., fatigue experienced in the course of firing maneuvers) seems to vary with the amount of training received by the pilot. Static contractions of muscle groups of the neck and of the spinal column in response to acceleration may eventually induce clinical symptoms and deformities.

3230 1953
Müller, B.
[THE INFLUENCING OF ALTITUDE

TOLERANCE BY INCREASING THE BODY TEMPERATURE] Die Beeinflussung der Höhenfestigkeit durch Erhöhung der Körpertemperatur. — Zeitschrift für Flugwissenschaften (Braunschweig), 1 (5): 131-136. Oct. 1953. In German, with English summary (p. 131). DLC(TL503.W557, v. 1)

Experiments were conducted to determine the effect of an increase in body temperature on the resistance to altitude sickness. Artificial fever in the ranges of 38° to 39.4° C. was induced in normal healthy subjects by injections of a fever-producing drug, "Artigon". A re-breathing apparatus permitting oxygen tensions of approximately 5000 m. to 6500 m. altitude was used to simulate high-altitude environment. An increase of body temperature up to 38° C. did not significantly lessen altitude tolerance as it was compensated by an increased blood flow and by hyperventilation. On the contrary, there was observed a slight tendency to an increase in the resistance of the organism to altitude sickness. At higher body temperatures, above 38° C., an unmistakable decrease in altitude tolerance was noted. The increases in minute volume and hyperventilation were insufficient to maintain the oxyhemoglobin concentration, which was manifested in a premature onset of altitude deterioration. The experiment also confirmed previous observations that an increase in blood temperature at decreased oxygen partial pressure, i.e., at increased altitude, acts in the sense of a decreased saturation of the hemoglobin.

3231 1953

Müller, E. A.

THE PHYSIOLOGICAL BASIS OF REST PAUSES IN HEAVY WORK. — Quart. Jour. Exper. Physiol. (London), 38 (4): 205-215. Oct. 1953. DNLM

Two methods are discussed for determining the proper length and number of pauses for best efficiency in performance of heavy work. The first method, which is rough and only reliable in rather heavy work, is to take 4 kcal./min. as an overall limit of working capacity and to give enough pauses to keep the average energy expenditure of a working group at this level. The second method takes the pulse rate as an index of sufficient blood supply to all muscles, and a sufficient blood supply to the working muscles as the principal necessity in avoiding fatigue. This method aims at keeping the pulse rate at a constant average level during the work phase and to prevent any kind of pulse debt which might lead to an increased number of pulses during recovery after work. This latter method has proved useful in arranging pauses which allow a man to work within his endurance limits. (From the author's conclusions)

3232

Mull, H. K.,
N. Ord, and N. Locke

THE EFFECT OF TWO BRIGHTNESS FACTORS UPON THE RATE OF FLUCTUATION OF REVERSIBLE PERSPECTIVES. – Amer. Jour. Psychol., 67 (2): 341-342. June 1954. DLC (BF1.A5, v. 67)

An attempt was made to discover the effects of two brightness factors upon the rate of fluctuation of reversible perspectives. The two factors considered were: brightness contrast between contour and background and illumination. The Necker cube was used as stimulus object for 36 female subjects. Results were inconclusive, indicating that: (1) neither a difference in amount of contrast nor of general illumination influences rate of fluctuation; (2) neither factor is more effective than the other. The adequacy of results explained in terms of a single-factor influence versus the combined influence of the first factor plus a motor factor is discussed.

3233

Murphy, C. W.,
J. P. Gofton, and R. A. Cleghorn

EFFECT OF LONG-RANGE FLIGHTS

ON EOSINOPHIL LEVEL AND CORTICOID EXCRETION. — Jour. Aviation Med., 25 (3): 243-248. June 1954. DLC (TL555.A1A4, v. 25)

Eosinophil levels and corticoid excretion levels were studied on two air crews of six members each, on two different long North-South flights from Montreal to Resolute Bay within the Arctic Circle and on control days. A significant (at the 5% level) eosinopenia was observed on only one occasion (at 24:00 on the first day of the first Resolute Bay trip); a significant increase in corticoid excretion was obtained in the 16:00-24:00 hour period on the first day of the first Resolute Bay trip, but a significant decrease was obtained in the 24:00-08:00 period on the first day and the 08:00-16:00 period of the second day of the second Resolute Bay trip. (From the authors' summary)

3234
Murray, W. D.

A GONDOLA FOR PHYSIOLOGICAL RESEARCH IN THE ATMOSPHERE. — Jour. Aviation Med., 25 (4): 354-360. Aug. 1954. DLC (TL555.A1A4, v. 25)

A descriptive account is given of a container constructed to carry biological specimens by balloon into the upper atmosphere in such a manner that their normal environment can be maintained. The container consists of two hemispheres made of aluminum and measures 28 inches in diameter. The sphere is designed to withstand an internal pressure of over 50 pounds per square inch. A cylindrical animal cage is placed inside the sphere. A circulating and cooling system is included to control the temperature and to effect efficient operation of the absorbing chemicals for removal of carbon dioxide and water vapor. An oxygen supply system is operated in conjunction with the carbon dioxide removal. Other fittings in the shell include a pressure safety valve, which opens when the internal pressure exceeds 25 pounds per square inch, and a blow-off valve, which opens when the unit returns to the earth. The container is surrounded by a 4-inch shell of styrafoam insulation and is wrapped in aluminum foil to reduce absorption of solar energy.

3235
Musser, J. F.

SELECTION OF FIRST OFFICERS FOR A COMMERCIAL AIRLINE. — Jour. Aviation Med., 25 (6): 671-674. Dec. 1954. DLC (TL555.A1A4, v. 25)

Selective procedures are described which are utilized by Trans World Airlines in the selection of First Officers (copilots) for passenger planes. The author feels that First Officers must not only meet the minimum technical requirements for a good pilot, but that they must also qualify as responsible individuals. The personnel office, the flight operations office, and the medical department work together as a team in the final selection of these future captains. Flight Operations has the final word on whether or not a candidate is selected.

3236
Myers, J.

BASIC REMARKS ON THE USE OF PLANTS AS BIOLOGICAL GAS EXCHANGERS IN A CLOSED SYSTEM. — Jour. Aviation Med., 25 (4): 407-411. Aug. 1954. DLC (TL555.A1A4, v. 25)

Estimates of critical characteristics of a photosynthetic gas exchanger have been presented for the particular case of a suspension of the alga Chlorella pyrenoidosa illuminated by artificial lighting. The relatively small quantity of 2.3 kilograms of Chlorella will provide for the gas exchange of one man. Expendable materials of fixed nitrogen and mineral salts will be required at a level of about 3.5 grams per man-hour. Both the product and the expendable materials may be reduced by recycling to an extent yet to be determined. Compact design of the gas exchanger is an engineering problem and not now estimated with any great precision; requirements of a large illuminated surface make up the principal

contribution to a rather large total volume. A severe limitation arises also in the low over-all efficiency which leads to high power requirements and attendant difficulties in heat dissipation. (Author's summary)

3237
Nagy, Z.,
and W. Wiltner
[THE EFFECT OF SELECTIVE HYPOXIA OF THE BRAIN AND OF SELECTIVE HYPOXIA OF THE TRUNK ON THE HEART MINUTE-VOLUME] Die Wirkung isolierter Hirnhypoxie und isolierter Rumpfhypoxie auf das Minutenvolumen [Abstract] — Acta physiologica Academiae Scientiarum hungaricae (Budapest), 6 (Supplement): 55-56. 1954. In German.
DLC (QP1.M333, v. 6)

The following results were obtained from animal experiments on changes in heart minute volume, blood pressure and peripheral resistance: (1) In hypoxia affecting the whole body, the heart minute volume increased, the blood pressure exhibited negligible changes, and the peripheral resistance decreased. (2) In hypoxia of the trunk the heart minute volume increased, and peripheral resistance decreased, while the blood pressure changed only slightly. And (3) in hypoxemia of the brain, caused by a decrease in blood oxygen content of the brain, no changes were registered in peripheral resistance, while the blood pressure rose slightly. Two hypotheses are advanced in explanation of these phenomena. First, there is a possibility that hypoxemia exerts an immediate vasodilatory effect, which results in an increase of the venous return to the heart and thus in an increased heart minute volume. On the other hand, it is possible that the receptor organs of the body are more sensitive than those of the brain and thus effect an increase of the heart minute volume. It has been shown in previous experiments that the blood volume of the kidney is invariably decreased in hypoxia, regardless of whether hypoxia is restricted to the brain or to the trunk. It follows, that the heart minute volume and the amount of blood in renal circulation during hypoxia, react in an opposite manner. (Translated in part and modified)

3238
Nahas, G. G.,
J. W. Josse, and G. C. Muchow
INFLUENCE OF ACUTE HYPOXIA ON PERIPHERAL AND CENTRAL VENOUS PRESSURES IN THE NON-NARCOTIZED DOG. - Amer. Jour. Physiol., 177 (2): 315-318. May 1954.
DLC (QP1.A5, v. 177)
Abstract in: Federation Proceedings, 13 (1[I]): 103. March 1954.
DLC (QH301.F37, v. 13)

Venous pressures were measured in dogs breathing room air and breathing 8% oxygen in nitrogen. During exposure to low oxygen, there was no change in effective pressures in the superior or inferior venae cavae. Under similar conditions there was a 2.3 mm. Hg and 1.4 mm. Hg increase in the venule and small vein pressures, respectively, in the dog's foreleg. The pressure gradient between venule and vein was similarly observed to rise during hypoxia. (From the authors' summary)

3239
Nahas, G. G.,
G. W. Mather, J. D. M. Wargo, and W. L. Adams
INFLUENCE OF ACUTE HYPOXIA ON SYMPATHECTOMIZED AND ADRENALECTOMIZED DOGS. - Amer. Jour. Physiol. 177 (1): 13-15. April 1954. DLC (QP1.A5, v. 177)

In five sympathectomized, non-narcotized dogs exposed to 8% oxygen in nitrogen, the changes in heart rate and cardiac output were of smaller magnitude than those observed on intact animals. In five adrenalectomized dogs studied under the same conditions these changes were not present. (Authors' conclusions)

3240
Nahas, G. G.,
M. B. Visscher, G. W. Mather, F. J. Haddy, and H. R. Warner
INFLUENCE OF HYPOXIA ON THE PULMONARY CIRCULATION OF NONNARCOTIZED DOGS. — Jour. Applied Physiol. 6 (8): 467-476. Feb. 1954. DLC (QP1.J72, v. 6)

Methods are described of measuring intracardiac pressures and cardiac output in the normal, trained, nonnarcotized hypoxic dog (breathing 8% oxygen in nitrogen). Under such experimental conditions, the following respiratory and circulatory changes were observed: (1) an increase in pulmonary artery pressure amounting to 405 mm. Hg and beginning within 1 min. after the onset of hypoxia, reaching a plateau after 5 min., and maintaining itself at that level during the period of hypoxia (pulmonary artery pressure fell to its control level within 102 min. after cessation of the low oxygen mixture); (2) no significant change in left arterial pressure; (3) a 34% increase in heart rate; (4) an increase in cardiac output measured 5 min. after hypoxia by the dye dilution method (56%) and by the pulse contour method (35%), (increase in cardiac output could account for the increased pulmonary artery pressure observed without postulating an increased pulmonary vascular resistance); and (5) a significant fall in oxygen uptake measured 5 min. after onset of hypoxia, over a 5-min. period. (Authors' summary, modified)

3241
Napolitano, L.,
and V. G. Longo
[PHARMACOLOGY OF THE VESTIBULO-OCULAR REFLEX. II. EFFECT OF ANTICHOLINESTERASES ON POST-ROTATORY NYSTAGMUS IN THE RABBIT: APPLICATION OF AN ELECTRONIC INTEGRATOR IN THE EVALUATION OF THE NYSTAGMIC RESPONSE] Farmacologia del riflesso vestibulo-oculare. II. Azione degli anticolinesterasici sul nistagmo postrotatorio del coniglio. Applicazione di un integratore elettronico nella valutazione della risposta nistagmica. — Archives internationales de pharmacodynamie et de thérapie (Bruxelles), 99 (2): 206-214. Sept. 15, 1954. In Italian, with English summary (p. 213). DNLM

Labyrinthine nystagmus was elicited by rotatory stimulation in rabbits, and the effects of various cholinesterase-inhibitors (physostigmine, isoflurophate, Tensilon) on the vestibulo-ocular reflex were studied. Physostigmine and isoflurophate demonstrated a facilitating effect as indicated by the increased duration and amplitude of nystagmus. Neostigmine had no effect in small doses, but an inhibitory effect in large doses. Tensilon had a slight facilitating effect which was exhibited only with regard to amplitude. The results are discussed in relation to the possible cholinergia mechanism of these drugs modifying a central reflex. In addition, a new method utilizing an electronic integrator for evaluating the nystagmic response is described.

3242
Nath, A. 1953
THREE CASES OF ACUTE OTITIC BAROTRAUMA. — Jour. of the Army Medical Corps (Poona, India), 9 (1): 21-24. Jan. 1953.
DNLM (W1N119, v. 9)

A brief description of three cases of acute otitic barotrauma among Indian Air Force personnel is given. The anatomy and function of the eustachian tube are considered, and the importance of knowledge of auto-inflation among flying personnel is emphasized. Etiology, symptoms, and treatment of the disease are also discussed. (Author's summary, modified)

3243
Nath, A.
ROLE OF MEDICAL OFFICER IN THE INDIAN AIR FORCE. — Aero Med. Soc. Jour. (New Delhi), 1 (2): 1-9. Oct. 1954. DNLM

The role of the medical officer in selection, training, and physical and psychological care of air crews is reviewed. The author discusses problems encountered in high altitude flight, high speed flight, survival and safety, air evacuation of casualties, aerial hygiene, and epidemiology.

3244
(Naval Air Test)
BIO-ACOUSTIC ASPECTS OF HIGH INTENSITY AIRCRAFT ENGINE NOISE, NATC-USS CORAL SEA. — Naval Air Test Center, Patuxent River, Md. Report no. 1 (Final Report), Jan. 29, 1954. i + 31 p. (Project TED no. PTR-SI-442). AD-37 415
UNCLASSIFIED

An investigation was conducted to determine the noise levels of the XF3H-1 and the F7U-3 airplanes and to determine the effects of these levels on human subjects. Sixteen subjects were exposed to sound pressure levels ranging from 124 to 150 db. No evidence of permanent or temporary hearing loss or nonauditory damage was observed. Fifty-four men were exposed to 25 bursts of noise at 9 catapult stations. The men wore combinations of V-51R ear defenders and earmuffs. It appeared feasible to operate aircraft that did not create sound levels above 150 db. without immediate adverse effects. The effects of prolonged exposure were not determined. Considerable evidence indicated that proper, efficient, and safe performance of flight deck duties under high sound pressure levels might be very difficult. Mandatory use of properly fitted V-51R earplugs was recommended for personnel exposed to excessive noise levels. Earmuffs alone are not to be considered adequate protection for long or repeated exposures. Earplugs and earmuffs are to be required in combination. (AD abstract)

3245
(Naval School Aviation Med.)
MISCELLANEOUS TESTS AND MINOR EVALUATIONS. — Naval School of Aviation Medicine, Pensacola, Fla. April 20, 1954. iii+54 p. (Project Report no. NM 001 058.25.04 through NM 001 058.25.15). AD 50 229(a-l)
UNCLASSIFIED

This is a collection of heretofore unpublished papers covering a wide range of subjects from statistical findings to administrative problems. They are all concerned with the problem of selection and training of naval aviators.

The following papers have been abstracted separately as items no.: 2370, 2371, 2423, 2520, 2978, 3104, 3389, and 3617.

3246
(Naval School Aviation Med.)
MISCELLANEOUS TESTS AND MINOR EVALUATIONS. — Naval School of Aviation Medicine, Pensacola, Fla. April 20, 1954. iii+57 p. (Project Report no. NM 001 058.25.19 through NM 001 058.25.29). AD 55 782 (a-k)
UNCLASSIFIED

This is the second series of brief reports containing research on selection and training of Naval Aviators (cf. item no. 3245). The following papers have been abstracted separately as items no.: 2372, 2421, 3135, 3187, 3596, 3617, and 3648.

3247
Neel, S. H.
MEDICAL CONSIDERATIONS IN HELICOPTER EVACUATION. — U. S. Armed Forces Med. Jour., 5 (2): 220-227. Feb. 1954. DLC (RC970.U7, v. 5)

The capabilities and limitations of helicopters in evacuating wounded personnel from battle areas are discussed in relation to the following: speed in evacuation, flexibility of medical service, patient comfort, selective evacuation, and economy. Speed, range, maneuverability over unfavorable terrain, and minimum landing site requirements permit the helicopter ambulance to rapidly transport a casualty without traumatic shock from a forward pick-up point to the treatment facili-

best equipped and staffed for his particular type of wound. These characteristics also allow flexibility of concentration, in that the controlling surgeon can quickly shift the helicopters to support any unit which is becoming immobilized with severely wounded casualties. Economy of personnel and equipment is realized with helicopter ambulances because there is no need for equipping and staffing every forward hospital for the care of every type of casualty. Initial cost, maintenance requirements, sensitivity to darkness and weather, and tactical problems (control of aircraft in flight, air-ground communications, co-ordination of supporting fires with helicopter sorties, etc.) impose limitations upon the use of helicopters as ambulances. Considerations involved in the selection and preparation of casualties for helicopter evacuation are also discussed.

3248
Neely, K. K.
A COMPARISON OF THE ICAO I AND ICAO II PHONETIC ALPHABETS AT VARIOUS ALTITUDES. — Defense Research Medical Labs. (Canada), Toronto, Ontario. DRML Report no. 118-1, Dec. 1954. vii+27 p. (DRML Project no. 118-43-108). AD 56 010
UNCLASSIFIED

A study of the ICAO I and ICAO II Phonetic Alphabets at various altitudes (sea-level, 15,000 feet, and 30,000 feet) indicated: (1) no statistically significant difference in word-intelligibility between the two alphabets; (2) no statistically significant difference in alphabet item word-intelligibility scores among positions in a three-word phrase; and (3) a highly significant difference, statistically, in the word-inteliigibility of the alphabet items among the three altitude conditions. (Author's abstract)

3249
[Neumark, O. W.]
INSTRUMENTATION BY REFLECTION. — Flight (London), 65 (2346): 35-36. Jan. 8, 1954.
DLC (TL501.F5, v. 65)

A new approach to the design of aircraft instrument panels is presented. The basic aims of the system are: (1) the area of instrument indications to be scanned by the pilot's eyes should be greatly reduced, eliminating the eye acrobatics necessary to scan present-day instrument layouts; (2) all instruments should be viewed with the eyes of the pilot accommodated and focused at infinity; (3) all instrument indicator movement should be capable of being seen and interpreted by wide-angle (parafoveal) vision, when the image of the central instrument is in direct focus (on the fovea centralis). The proposed method of achieving these aims is to view the instrument through collimating lenses and reflectors, the images becoming visible to the pilot as red or orange reflections on a black panel which is effectively a continuation of the windscreen into the cockpit. By using the proposed system the psychological conflict inherent in instrument-flying training would be eliminated, and the subjugation of the sense of balance would be made easier. The greatest advantage of the system is that there is no time-delay in refocusing one's eyes during the transition from instrument to visual flight during bad-weather approaches and landings.

3250
Nevis, E. C.
THE EFFECTIVENESS OF THE WORTHINGTON PERSONAL HISTORY TECHNIQUE IN ASSESSING LEADERSHIP POTENTIAL [Abstract] — Amer. Psychologist, 9 (8): 440. Aug. 1954.
DLC (BF1.A55, v. 9)

As part of a larger leadership evaluation research project, a six-page modification of the Personal History Technique was administered to over 300 Air Force captains. The protocols of 100 of these officers were analyzed according to the Worthington system, in

which each item is scored in reference to 26 personality variables. To evaluate the comparability with other methods, Personal History variables were used to predict the composite ratings of 10 psychologists on 30 assessment variables. These were derived by the University of California's Institute of Personality Assessment and Research during an intensive living-in assessment which combined many clinical and situational measuring devices. Personal History assessments were also validated against two sets of complex performance criteria. Correlations ranging between .01 and .56 were obtained between Personal History and criterion assessments. Scores based on these patterns were also correlated with appropriate performance factor scores. The 26 validity coefficients ranged from zero to .52. These results, as well as additional evidence of the technique's validity, are discussed. Several findings of possible value to future leadership research are also presented. (Quoted in part)

3251
Newsom, B. D.,
and D. J. Kimeldorf
INCREASED TOLERANCE TO HYPOXIA IN IRRADIATED AND IN FOOD-DEPRIVED RATS. — Amer. Jour. Physiol., 177 (3): 390-394. June 1954. DLC (QP1.A5, v. 177)

There is an increase in tolerance to lethal levels of hypoxia over that of controls following X-irradiation in rats. The effect disappears approximately 5 days after exposure to 500 and 600 r and corresponds in duration to the postirradiation period of anorexia. When deprived of food for 72 hours, non-irradiated animals have an increased tolerance to hypoxia comparable to that of irradiated animals. Seventy-two hours after irradiation there is an increase in the time required for asphyxiation. This increase can be duplicated in non-irradiated animals by food deprivation and is not dependent on carbon dioxide accumulation. These experiments demonstrate that the increased tolerance to hypoxia which follows irradiation is, at least in part, a consequence of postirradiation anorexia. (Authors' summary)

3252
Nicoll, N. R.
DESIGN OF THE LIFE COMPARTMENT NECESSARY FOR SPACE TRAVEL. — Jour. Brit. Interplanetary Soc. (London), 13 (5): 277-282. Sept. 1954. DLC (TL790.A1B7, v. 13)

The composition of a life compartment for space travel is proposed, with an overall weight calculated to be 2,038.00 lb. It is of a double-walled construction to reduce the heat transfer and the risk of damage through punctures caused by meteorites and will have built-in plastic portholes permitting diffused light to enter. CO_2 removal will probably be effected by lithium oxide. For short trips the cracking of CO_2 to recover oxygen would not be economical since it is easier to carry additional O_2 in liquid form and dispense it by means of simple apparatus at a moderate rate, e.g., 2.2 lb. per man per day. Reclamation of water vapor is possible through a small refrigerating plant, which at the same time would deal with excess generated heat. For relief from the effects of zero gravity it is suggested that gravity be simulated by rotating the ship about its axis with the help of small rocket motors placed tangentially on the periphery. To provide a gravity comparable to that on earth for a life compartment of 18 ft. diameter it is necessary to rotate the ship at a speed of 3.3 rev./min. The control of artificial gravity would be non-automatic to permit experimentation with zero gravity. A stationary view of the outside universe could be achieved by rotating a system of mirrors or prisms in phase with ship. Two airlocks would permit the entry and exit from the life compartment. The toilet requirements for short journeys could be taken care of by chemical disposal of waste and purification of urine for secondary purposes.

3253
Noble, R.,
and E. S. Mendelson
AFTERBURNER NOISE MEASUREMENTS IN GROUND ENGINE RUN-UPS. — Naval Air Experimental Station. Aeronautical Medical Equipment Lab., Philadelphia, Pa. Report on Study of Hazards Due to Noises Generated in Naval Aviation Activities and of Methods of Protection Against Such Hazards; and on Aviation Injury and Crash Studies: Effects of Jet Engine Afterburner Noise. Report TED no. NAM AE-6513.1, Feb. 23, 1954. 27+4 p. (Project no. NM 001 062.05.02). AD 30 507 UNCLASSIFIED

Data collected on afterburner noise during four tests involving the F-94B aircraft included determinations of over-all sound pressure levels and frequency distributions. The climatic conditions during the tests were sufficiently similar so that no observations could be made of the effects of meteorological variations. The following generalizations of the sonic spectra can be drawn from the observed data: (1) the variability of the calculated over-all sound pressure level was greater from test to test than within a single day; (2) the variation of the frequency pattern at a particular location on any single day was sufficiently small for generalizations on the characteristics of the various spectra to be made; and (3) the higher sound intensities of the noise emanating from jet engine powered aircraft with afterburners is concentrated toward the rear and exhaust regions of the aircraft. (AD abstract)

3254
Noble, R.
ANALYSIS OF NOISE GENERATED BY AIRCRAFT ENGINES. II. ENGINES OPERATED IN TEST CELLS. — Naval Air Experimental Station Aeronautical Medical Equipment Lab., Philadelphia, Pa. Report no. TED NAM AE-6513 NM 001062 01.10 (Report no. 10, on An Investigation of Health Hazards Incidental to Operation of Engine Test Cells), Aug. 2, 1954. 13 p. AD 40 574 UNCLASSIFIED

Overall sound pressure level measurements and determinations of sonic spectral distributions were made on several engines being operated in engine test cells. General characteristics of the noise measurements are described, and comparisons of measured and calculated overall sound levels are made. (Author's abstract)

3255
Noble, R.
HUMAN ENGINEERING INVESTIGATION OF AIRCRAFT COCKPIT VISUAL DISPLAY: DIAL DESIGN FOR MACH-AIRSPEED INDICATOR. — Naval Air Material Center. Aero Medical Equipment Lab., Philadelphia, Pa. Topical Report no. XG-T-237, Dec. 9, 1954. (TED no. NAM AE-7047.5). AD-49 795 UNCLASSIFIED

Two dial and pointer indicators are evaluated. The chief difference between the two indicators is that Proposal A presents airspeed over the entire peripheral scale and Proposal B presents airspeed over the initial portion of the peripheral scale and Mach number over the remainder of the peripheral scale. It is recommended that Proposal B be considered for service use in preference to the type presented in Proposal A on the basis of the following: (1) An indication of airspeed from 80 to 850 knots and Mach number from 0.40 to 2.0 is available in an uncluttered presentation. (2) Maximum Mach indication can be set directly on the Mach scale without the need of barometric manipulations. (3) Above 200 knots emphasis is placed on Mach indication rather than air speed indication. With the continuing development of high performance aircraft, Mach indications as the limiting operational characteristic are becoming more prevalent and useful. And (4) although emphasis is placed upon Mach number, the air-speed scale is available for those pilots who prefer it.

3256
Noltie, H. R.
EFFECT OF A HOT, HUMID ATMOS-

PHERE ON THE PACK FITNESS INDEX. — Jour. Applied Physiol., 7 (1): 105-108. July 1954.
DLC (QP1.J72, v. 7)

The Harvard Pack Test [a physical fitness test] was carried out on 11 male subjects, of age range 21-50 years, both in laboratory and in hot room conditions. All the subjects were at least moderately fit. Their Index ranged from 77 to 114 in the cold (effective temperature about 14°C.) and from 67-96 in a hot room (effective temperature about 30° C.), the average decrease in Index being 11%. The subjects judged fitter by having a higher Index than did those less fit, but too few subjects were examined to make this a firm conclusion. Repetitions of the test were carried out on one subject at intervals of 1 hour, and of 20 minutes in two series of experiments. This proved very fatiguing when the 2nd series was carried out in the hot room and caused a great fall in the Index. No investigation was made as to possible salt and water loss. (Author's summary)

3257
Nordenson, J. W.
[BINOCULAR VISUAL ACUITY] Tvåögig synskärpa. — Nordisk medizin (Stockholm), 51 (3): 90-92. Jan. 14, 1954. In Swedish, with English summary (p. 92). DNLM

In many cases where the visual acuity on monocular examination is found equal in both eyes, a higher visual acuity is found on the binocular examination. Explanations for this are based on the assumption that the retinal image in these cases are identical. In general, this is not the case. The normally oblique incidence of the line of sight into the optical system of the eye causes asymmetry of the retinal image and stronger illumination of its temporal part. Thus the nasal part of an object is more closely seen by each eye than the temporal. If these two images are then fused, the object will be more distinctly seen, and hence the binocular vision will rise above the monocular. (From the author's summary).

3258
Numeroso, N., and R. Misité 1953
[THE ROSENZWEIG PICTURE FRUSTRATION TEST: ADAPTATION AND STANDARDIZATION ON AN ITALIAN SAMPLE GROUP] Il P. F. test di Rosenzweig. Adattamento e standardizzazione su un gruppo campione italiano. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 367-380. In Italian, with English summary (p. 379). DNLM (W3.C0943a)

A discussion is presented of the applicability of Rosenzweig's picture frustration test in a battery of personality tests for the selection of flight personnel. Administration of the test to an Italian group of subjects is described along with an interpretation of the results. Differences between Italian, French, and American standardizations are presented, along with the differences between subjects from various Italian districts.

3259
Nutt, A. B.
A METHOD FOR MORE ACCURATE DESIGN ESTIMATION OF AIR LEAKAGE FROM CABINS AND COCKPITS OF PRESSURIZED AIRCRAFT. — Wright Air Development Center. Aircraft Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-446. Sept 1954. iv + 23 p. (Project no. 1368, Task no. 13400) AD 67 362 PB 130404

A review of current methods of determining air leakage from pressurized aircraft cockpits and cabins is made. An empirical method for more accurately calculating and predicting such leakage is presented. A bibliography is incorporated as a source of more detailed information on current leakage amounts and methods of determination (Author's abstract)

3260
Nyborg, W. L.
CONTROLLED SONIC IRRADIATION OF LIVING ORGANISMS. — Pennsylvania State Coll., State College. (Contract AF 33 (038)-786); and Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-128, March 1954. v+40p. (RDO no. 695-63). AD 29 930
UNCLASSIFIED

Techniques and equipment are described for the irradiation of living organisms by high-intensity sound at audio and ultrasonic frequencies under controlled and specifiable conditions. An air-driven siren is described which was used to provide large quantities of acoustic power. Techniques were developed for exposure of suspensions of bacteria in liquids to sound generated by the air siren. The use of a semi-infinite tube and its modifications with the air siren proved to be the most satisfactory technique. Commercial loudspeakers were used effectively for exposure of subjects to intermediate sound levels in the audible range. The loudspeakers were particularly appropriate where bands of noise were required at sound levels of 100 to 120 db. above threshold. The jet-edge-resonator (JER) whistle furnished a cheap convenient sound generator capable of producing sound pressures of sufficient magnitude to cause biological changes. The construction and operation of two types of JER whistles are explained. Results are also discussed of measurements made on sound fields. (AD abstract)

3261
Nye, R. E.
INDIRECT ESTIMATION OF ALVEOLAR CARBON DIOXIDE TENSION. — Jour. Lab. and Clinical Med., 43 (4): 662-668 April 1954.
DLC (R11.J695, v 43)

The practical value of any easy, indirect method for measuring end-tidal carbon dioxide tension in respirator patients is noted. Two indirect approaches, based, respectively, on measurement of end-tidal oxygen tension and of ventilation and oxygen consumption, have been examined in normal subjects and one respirator patient. The first approach is sufficiently accurate to merit clinical trial in the hope of recommending it for small institutions without elaborate facilities. The second approach, while requiring simpler apparatus, is of doubtful value. A third indirect approach of greater accuracy, described by Behrmann, is suggested as being applicable to the problem, and an apparatus is described for collecting sufficient end-tidal air to permit its use. (Author's summary)

3262
Nystrom, C O ,
and D. A. Grant.
PERFORMANCE ON A KEY PRESSING TASK AS A FUNCTION OF THE ANGULAR CORRESPONDENCE BETWEEN STIMULUS AND RESPONSE ELEMENTS. — Univ. of Wisconsin, Madison (Contract AF 18(600)-54); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-71, Jan. 1954. v+16 p. (RDO no. 694-49). AD 35 130
PB114767

The authors studied the effect of angular noncorrespondence between indicators and controls on the performance of 5 groups of 18 subjects on a key-pressing task on the Multiple Serial Discrimeter. For different groups, the stimulus-light display was placed in one of five angular orientations, 0°, 45°, 90°, 135°, or 180° counter-clockwise, relative to the fixed horizontal set of response keys. Half of the subjects of each group matched 2-light patterns, while the other half matched 4-light patterns; during the second half of the experiment, this situation was reversed. A significant difference occurred in the effects of the stimulus-light orientation variable on performance The 0°, then the 90°, and then the combined 135° and 180° orientations

led to successively poorer performance. The 45° orientation resulted in performance equal to that of the 0° orientation among the 5 groups matching 2-light patterns first, and equal to the 90° orientation among the 5 groups matching 4-light patterns first. The 2-light patterns were matched significantly faster (1.10 second) than the 4-light patterns. Greater positive transfer effects were observed in transferring from 4- to 2-light patterns than in transferring from 2- to 4-light patterns. (AD abstract)

3263
Oberth, H.
[MEN IN SPACE] Menschen im Weltraum. — 256 p. Düsseldorf: Econ-Verlag, 1954. In German.
DLC (TL790.028)

The concept of space travel as a development of the science of rocketry is discussed. Although the physiological maintenance of man at high altitude (effective physiological space conditions) has already been accomplished, complete separation from the earth's atmosphere and gravitational pull present additional problems. A comprehensive discussion of these problems, including weightlessness, cosmic rays, meteors, mobility without gravity, temperature regulation, and production of equipment, is presented, and specific solutions are proposed. Theoretical and technological implications of the satellite, space station, and space mirror projects, among others, are treated.

3264
Oberth, H.
[RECENT IDEAS CONCERNING SPACE FLIGHT PROBLEMS] Neuere Ideen über Raumfahrtprobleme. — Weltraumfahrt, 5 (3): 89. July 1954.
DLC (TL789.W45, v. 5)

Although the space suit has been compared and thought of as similar to suits developed for high altitude flight, demands placed on the former are actually quite different. The lack of gravity imposes the necessity of providing a certain amount of inertia throughout the body with the exception of the extremities. A two-layered suit has been proposed by W. v. Braun, which also affords protection against cosmic dust. However, such suit might be impractical as it would hinder and restrict the mobility of the wearer. (Sketches of several designs providing movable joints are included.) Moreover, any space clothing must enable the wearer to withdraw his arms in order to manipulate instruments within the suit. The possibility of conditioning hands to gravity-less environments is envisioned, thus permitting manipulations with bared hands for short periods of time.

3265
Occhipinti, R. P. J. 1952
[I HAVE (AGAIN) PASSED THE MEDICAL EXAMINATION FOR PILOTS] J'ai (encore) passé la visite médicale P. N. — Orion (Paris), 1952 (21 [actually 22]): 56-61. Sept.-Oct. 1952. In French. DLC (UG635.F807, v. 1952)

The author's experience in undergoing a medical examination for airmen is humorously related. The examination included an electro-encephalogram, hearing and eye tests, and chamber decompression.

3266
O'Donnell, J A ,
and J. V Grimaldi
GROUND SAFETY IN AVIATION OPERATIONS. — 71 p. New York: New York University, 1954.
DLC (TL553.5.O3)

Practical considerations of aviation ground safety are discussed. Topics considered, including the handling of aircraft on the ground, working with dangerous substances, fire prevention, and maintenance of equipment, are treated chiefly in their procedural and planning aspects. Thus the handbook is suitable particularly for the use of supervisory personnel.

3267
(Office of Naval Research)
INSTRUCTOR'S MANUAL FOR HIGH ALTITUDE PHYSIOLOGY TRAINING IN LOW PRESSURE CHAMBERS. — Office of Naval Research. Special Devices Center, Port Washington, N. Y. NAVEXOS P-1260, Device 9A Series. vi+81 p. April 1954. UNCLASSIFIED

This is a manual for instructors in high-altitude physiology using low-pressure chambers for the training of aviation personnel. The subjects discussed are anoxia, equalization of pressure in the surrounding air and body cavities (middle ear, sinuses, stomach, intestine), decompression illness, cold, oxygen breathing, and low-pressure chambers and their operation

3268
Ogle, K. N.
BASIS OF STEREOSCOPIC VISION. — A. M. A. Arch. Ophthalmol., 52 (2): 197-211. Aug. 1954.
DLC (RE1.A62, v. 52)

Data are described which suggest that there are two aspects of stereoscopic depth perception: (1) a true quantitative, or obligatory, sense of depth that necessitates the simultaneous stimulation of horizontally associated disparate retinal elements, and (2) a vaguer qualitative, or facultative, percept of depth, also arising from disparate images. This provides the individual with an experience only of "farther" or "nearer" than the point of fixation; this perception appears to be empirical in nature. The obligatory, or true, stereopsis, because of the limitation imposed through the necessity of stimuli falling on horizontally associated disparate retinal points, implies a physiologic and neuroanatomic basis. The facultative depth perception would be classed with the empirical factors of spatial localization. The experiments show that the facultative depth is enhanced by momentary stimuli, but depressed with continuously visible disparate stimuli. Eye movements would enhance this aspect of depth perception. (Author's summary)

3269
Olguin, V. V.,
and J. B. Martínez
[STUDIES ON RESPIRATORY FUNCTION IN ASTHMATICS AT SEA LEVEL AND AT ALTITUDE] Estudios sobre función respiratoria en asmáticos a 0 metro y en altura. — Medicina (Buenos Aires), 14 (3): 178-188. June 1954. In Spanish, with English summary (p. 187) DNLM

Ventilatory and respiratory functions were studied in 6 asthmatic subjects at sea level and at a simulated altitude of 3,000 meters. The processes studied included respiratory frequency, vital capacity, complimentary and supplementary air, residual capacity, residual air, total capacity, respiratory dead space, respiratory minute volume, expired air, alveolar air, O_2 consumption, CO_2 production, and respiratory quotient. The results obtained demonstrate the general physio-pathological state of the patients, and also reveal their inability to adapt to new atmospheric conditions. (Authors' summary, modified)

3270
O'Neill, J. J.
RECOGNITION OF INTELLIGIBILITY TEST MATERIALS IN CONTEXT AND IN ISOLATION. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr-22525); and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 064.01.23) Joint Project Report no. 23, June 15, 1954. 5+4 p. AD 41 481 PB 115727

Thirty-nine experimental subjects listened to 50 sentences and 291 words. The sentences were part of a standard sentence intelligibility test, and the words were taken out of the context of these same sentences. These materials were presented at five speech-to-noise ratios: -12 db., -6 db., 0 db.,

+6 db., and +12 db. Comparisons were made of the recognition of the words in context and in isolation. It was found that the intelligibility scores for the isolated words tended to be lower than for the same words in context. The lowest intelligibility scores occurred at -12 db. and 0 db. speech-to-noise ratios. (Author's summary)

3271
Onesti, R.
[ANALYSIS OF THE PSYCHOPHYSIOLOGICAL IMPLICATIONS IN SOME AVIATION ACCIDENTS IN A JET PILOT TRAINING SCHOOL] Analisi delle cause di carattere fisio-psicologico in alcuni incidenti di volo in una scuola di velivoli a reazione. — Rivista di medicina aeronautica (Roma), 17 (1): 67-80. 1954. In Italian, with English, French, Spanish, and German summaries (p. 78-79).
DLC(TL555.A1R5, v. 17)

The psychological factors involved in aviation accidents due to human failure on the part of the pilot are illustrated by three case histories. In all instances it is evident that the pilots acted against their better judgment and violated previous instructions. An analysis of the cases leads to the conclusion that a more rigid elimination of psychologically unstable aviation trainees should be enacted; however, nothing short of observation of pilot behavior under actual flight conditions by a trained psychologist will assure reliable standards of rating. In general, closer cooperation of instructors and psychologists is recommended.

3272
Orlandi, A., and A. Scano 1953
[THE FLACK TEST AND OTHER FUNCTIONAL INVESTIGATIONS IN 520 PILOT CANDIDATES AND PILOTS FROM 19 TO 51 YEARS OF AGE] La prova di Flack ed altre indagini funzionali in 520 aspiranti al pilotaggio ed aviatori dai 19 ai 51 anni. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953), Parte III: Comunicazioni, p. 381-390. In Italian, with English summary (p. 388).
DNLM (W3.C0943a)

The following results were obtained from respiratory and cardiovascular function tests administered to 520 pilot candidates and pilots from 19-51 years of age: (1) vital capacity was slightly increased in 19-30 year old subjects and decreased in older subjects. (2) The maximum time of voluntary apnea and of the Flack test was slightly decreased. (3) Pulse frequency in the horizontal position increased in younger subjects and decreased in older ones. All subjects showed an increased frequency in the standing position. Under the same condition arterial pressure increased from the average value of 122 mm./Hg to 126 mm./Hg. (From the authors' summary)

3273
Osborn, J. J. 1953
EXPERIMENTAL HYPOTHERMIA: RESPIRATORY AND BLOOD PH CHANGES IN RELATION TO CARDIAC FUNCTION. — Amer. Jour. Physiol., 175 (3): 389-398. Dec. 1953.
DLC (QP1.A5, v. 175)

Arterial pH and some elements of respiratory exchange were followed during deep hypothermia in dogs. The normal response to hypothermia consists of an initial rise in arterial pH due to hyperventilation, followed (when the body temperature drops below 29° C.) by a prolonged fall in pH, apparently due to CO_2 retention. This apparent respiratory acidosis may persist and increase in spite of artificial respiration at a constant minute volume. Major changes in arterial pH during hypothermia were significantly associated with high mortality. Animals surviving rewarming for over two hours have been those in whom the arterial pH was maintained relatively constant by mechanical control of the respiratory minute-volume. In a small series of animals, induction of respiratory acidosis for an hour before cool-

ing appeared to have a protective effect. The only animals who achieved long-term survival after body temperatures under 19° C. were in this group. (From the author's summary)

3274
Pace, D. 1953
[USE OF THE EJECTION SEAT IN THE F-84 TURBOJET AND OBSERVATIONS ON THE INCIDENTS] Uso del seggiolino ejettabile nel turboreattore F.84 e osservazioni sugli incidenti. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 403-416. In Italian, with English summary (p. 416).
DNLM (W3C0943a)

Technical notes and illustrations are presented on the use of the ejection seat in the F-84 turbojet. Three cases of ejection tests are discussed (2 fatal, 1 successful) including the factors which inhibit ejection (acceleration and gravity forces, seat rotation and pilot's loss of consciousness). The best conditions for ejection bailout are: velocity of 250-625 miles per hour and an altitude between 700-30,000 feet.

3275
Packard, J. M.,
J. S. Graettinger, and A. Graybiel
ANALYSIS OF THE ELECTROCARDIOGRAMS OBTAINED FROM 1000 YOUNG HEALTHY AVIATORS: TEN YEAR FOLLOW UP. — Circulation, 10 (3): 384-400. Sept. 1954.
DLC (RC681.A1C5, v. 10)

Electrocardiograms of 1000 healthy aviators between the ages of 20 and 30 years were taken and analyzed between 1940 and 1942. In 639 of the men, electrocardiograms were taken in 1940 and again in 1950 and subjected to statistical analysis. There was a wide range of measurements of the electrocardiograms, but for the most part in the individual cases the change over the period of ten years was relatively slight. This was true both for the normal electrocardiograms and for 90 which fell in the borderline zone between normal and abnormal. In 8% of the cases, comparison of the two tracings revealed significant differences. In most of these cases the differences consisted of inexplicable appearance or disappearance of borderline variations, probably indicating a lack of reliability in the electrocardiographic method. Of four men with definite heart disease, only one had an abnormal electrocardiogram, and of 20 men with possible heart disease, as evidenced by hypertension or enlarged hearts, none had an abnormal electrocardiogram. Conversely, a number of men with borderline or abnormal tracings, who were observed for ten years, had no other subjective or objective evidence of heart disease. These data confirm the lack of validity of the electrocardiographic method.

3276
Paganelli, A., 1953
and C. Colella
[ON A TYPICAL TRAUMATIC LESION OF PARACHUTISM: "OBLIQUE SUPRAMALLEOLAR FRACTURE OF THE FIBULA ASSOCIATED WITH DESTOT'S MALLEOLAR-TIBIAL FRACTURE"] Su una lesione traumatica tipica da paracadutiamo: "frattura soparmalleolare obliqua del perone associata a frattura del malleolo tibiale di Destot". — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p 417-429. In Italian, with English summary (p. 428).
DNLM (W360943a)

A general discussion is presented on the incidence, mechanism and X-ray pathology of oblique suparamalleolar fractures of the fibula with fracture of the third malleolus and tibia commonly occurring after parachute jumps. In relating this injury with various landing techniques, it is concluded that it occurs less frequently when landing on the forefoot.

3277
Page, E., 1953
and L. M. Babineau
THE EFFECTS OF DIET AND COLD ON BODY COMPOSITION AND FAT DISTRIBUTION IN THE WHITE RAT. — Canadian Jour. Biochem. and Physiol. (Ottawa), 31 (1): 22-40. Feb. 1953. DLC (R11 C37, v. 31)

From an insulation standpoint, high fat rations may be beneficial in the cold through an increase in total body fat but not through a more efficient distribution with respect to preservation of body heat, since neither the fat content of the ration nor environmental temperature affect fat distribution. Any difference in efficiency of food utilization between high and low fat diets appears to be the same in the cold as at room temperature. Livers are smaller on a high fat ration both at room temperature and in the cold. Both livers and kidneys are larger in the cold than at room temperature. Average values for body water expressed as percentages of the lean body mass were the same in the cold as at room temperature. (Authors' abstract)

3278
Page, E., 1953
and L. P. Chenier
EFFECTS OF DIETS AND COLD ENVIRONMENT ON THE RESPIRATORY QUOTIENT OF THE WHITE RAT. — Revue canadienne de biologie (Montreal), 12 (4): 530-541. Dec. 1953: In English. DLC (QH301.R47, v. 12)

Rats adapted to cold (5°C.) demonstrated lower respiratory quotients than non-adapted animals at 29°C., whether in the fasted state or following the administration of a fat meal. They exhibited a significantly higher respiratory quotient following maltose administration than the non-adapted animals, both at 29°C. and at 5°C., irrespective of previous diet. These results indicate that rats consume fats preferentially in the cold, and that an increased rate of turnover of sugar into fat is to be found in cold adapted rats.

3279
Page, E.
LOW TEMPERATURE CONSIDERATIONS. — In: Spector, H., and M. S. Peterson (ed.), Nutrition under climatic stress ..., p. 183-191; discussion, p. 200-203. Nat. Acad. of Sci.—Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 UNCLASSIFIED

The increased heat production in man in a cold environment is sustained by larger food intake, whereby the choice of nutrients may differ from that required for maintaining body heat in a temperate environment. Most of the evidence points to protein as being undesirable as a fuel for extra heat production in the cold. The findings apply to proteins from a quantitative standpoint and do not bear on the qualitative differences between them. There is some experimental evidence that high-fat rations are significantly better than high-carbohydrate rations in man during exposure to cold. Investigation of heightened vitamin requirement by man in a cold environment has been largely negative. It is thought that increased requirements are in some cases not due to cold per se, but a result of the higher metabolic rate, or the coming into pre-eminence of a particular biochemical process. The possibility of a biochemical adaptation to cold expressed in metabolic shifts is discussed in relation to a review of findings from animal experiments of heat production in cold.

3280
Page, E.,
and L. M. Babineau
TISSUE GLYCOGEN AND GLUCOSE ABSORPTION IN RATS ADAPTED TO COLD. — Canad. Jour. Biochem. and Physiol. (Ottawa), 32 (4): 395-399. July 1954. DLC (R11.C37, v. 32)

Fasted rats previously fed a high fat ration and adapted to cold maintain liver glycogen as efficiently as their controls kept at room temperature. On a high carbohydrate diet, fasting liver

glycogen is markedly higher in the cold adapted animals. Glucose absorption rate on the high fat regime is nearly 70% higher following adaptation to cold. (Authors' abstract)

3281
Page, H. E.
THE ROLE OF PSYCHOLOGY IN ONR. — Amer. Psychologist, 9 (10): 621-628. Oct. 1954. DLC (BF1.A55, v. 9)

This article summarizes areas in which the Office of Naval Research (U. S. Navy) actively supports psychological research in the fields of human engineering, personnel and social psychology, as well as basic theoretical psychology. Among the psychophysiological studies of sensory mechanisms, the following are noteworthy: investigation of perception of short-exposure visual stimuli while breathing various combinations of oxygen and air; visual and stereoscopic acuity for fast-moving objects; visual perception of space and motion; and influence of the non-auditory labyrinth on the effective function of the human organism. Physiological and psychological effects of high-intensity noise are being investigated with respect to vestibular and postural disturbances. A rather wide distribution of reports emanating from this research is made to service-connected and selected university laboratories. Copies are filed with the Library of Congress and with each of the Service libraries. Principal investigators frequently receive available additional copies on request.

3282
Pancheri, G., 1952
and G. Mancioli
[FOR THE APPLICATION OF GROUP AUDIOMETRY AMONG WORKMEN] Per la diffusione dell'audiometria collettiva fra i lavoratori. — Rassegna di medicina industriale (Roma), 21 (5): 335-343. Sept.-Oct. 1952. In Italian. DNLM

The Massachusetts hearing test as adapted for group audiometry is discussed, and its performance on workers exposed daily to noise as well as on those working in a relatively noise-free environment is evaluated. This method is suitable for testing hearing function and for the diagnosis of hearing disorders in workers. It is also of value in the prevention of occupational deafness.

3283
Parkin, P. H.,
and H. J. Purkis
NOISE LEVELS UNDERNEATH SOME CIVILIAN AIRCRAFT SHORTLY AFTER TAKE-OFF. — Acustica (Zürich), 4 (4): [507-508]. 1954. In English. DLC (QC221.A5, v. 4)

The maximum sound pressure levels (in octave bands) were measured underneath several types of civilian aircraft, including piston, propjet, and turbojet engines, shortly after take-off. A table of the results is given. Since the height of the aircraft varied from 15-90 m., the results have been corrected to a standard height of 38 m.

3284
Parle, F. S.
AN INDUSTRIAL ASPECT OF AVIATION MEDICINE. — Med. Jour. Australia (Sydney), 1 (13): 461-462. March 27, 1954. DNLM

The various aspects of the work of mechanics and engineers who service and maintain aircraft are considered in relation to the medical hazards which may be associated. These hazards may be summarized as follows: (1) foreign bodies in eyes, (2) lacerations, abrasions, and bruises, and (3) minor indispositions possibly related to weather. Points of similarity between these facets of aviation medicine and those of industrial medicine are briefly pointed out.

3285
Parrack, H. O.
PROTECTION FROM AIRCRAFT NOISE. — A. M. A. Arch. Indus. and

Occupational Med., 10 (4): 273-287. Oct. 1954. DLC (RC963.A14, v. 10)

One approach to problems related to man's protection from noise is based upon the concept of a functional system, consisting of acoustic energy sources, acoustic energy transfer media (paths), and acoustic energy receivers, man being the principal receiver considered. Examples of the application of the functional system concept are presented and currently available measures for man's protection from noise evaluated. The evaluations considered the following special areas: protection of the ear—prevention of deafness; protection of the capacity to communicate by voice signals, and general problems relevant to protection of other human functions, including a discussion of the problem of protecting communities from the noise of flight operations. In these evaluations technical areas have been cited in which additional work is required. (From the author's summary)

3286

Pasargiklian, M., 1952
L. Ghiringhelli, and C. Molina

[EFFECT OF THE INTRODUCTION OF A RESPIRATORY DEAD SPACE ON GASEOUS EXCHANGE DURING WORK] Influenza della introduzione di uno spazio morto respiratorio sul metabolismo gassoso durante lavoro. — Medicina del lavoro (Milano), 43 (4): 174-178. April 1952. In Italian, with English summary (p. 178). DNLM

The effects of added dead space (breathing through a tube of 100, 200, or 300 cc.) on respiratory gas exchange were studied. While walking at speeds of 1, 3, 4, and 5 km. per hour, the subject was able to overcome the effect of the added dead space by increasing the depth of respiratory movements. At a speed of 6 km./hr. however, the alveolar CO_2 tension increased and led to a corresponding reduction in the alveolar O_2 pressure, thus diminishing the working capacity.

3287

Pasargiklian, M., 1953
and E. Sartorelli

[COMPARISON BETWEEN THE METHODS AT REST AND DURING WORK IN AN OPEN OR CLOSED CIRCUIT FOR THE EVALUATION OF RESPIRATORY FUNCTION] Confronto tra i metodi in riposo ed in lavoro, in circuito aperto e chiuso, per la valutazione della funzione respiratoria. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 434-440. In Italian, with English summary (p. 439-440).

DNLM (W3.C0943a)

A comparison is presented of the respiratory function tests performed at rest (Tiffeneau's spirographic method), and during work on a treadmill ergometer using Margaria's open-circuit or Knipping's closed-circuit methods. It is noted that all tests are good indicators of pulmonary function; however, Tiffeneau's spirographic method tends to give results of a variable and individual character.

3288

Pasargiklian, M., 1953
and G. Cornia

[ON THE BEHAVIOR OF PULMONARY VENTILATION DURING MUSCULAR EXERCISE IN SUBJECTS OVER 60 YEARS OF AGE] Sul comportamento della ventilazione polmonare durante l'esercizio muscolare nei soggetti oltre i 60 anni. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 430-433. In Italian, with English summary (p. 432).

DNLM (W3C0943a)

A higher rate of pulmonary ventilation was observed in men between 65-73 years of age performing muscular exercise on a treadmill ergometer. Ventilation studies were executed using Knipping's method and apparatus.

3289
Pasargiklian, M., 1953
E. Sartorelli, and E. Giorgi
[ON RESPIRATORY INSUFFICIENCY OF PULMONARY AND CARDIOCIRCULATORY ORIGIN: EXPERIMENTAL RESEARCH ACCOMPLISHED WITH THE KNIPPING METHOD ON SUBJECTS AFFECTED WITH SILICOSIS AND HEART DISEASE] Sull'insufficienza respiratoria d'origine polmonare e d'origine cardio-circolatoria: ricerca sperimentale eseguita col metodo di Knipping in soggetti affetti da silicose e in cardiopazienti. — Medicina del lavoro (Milano), 44 (8-9): 329-382. Aug.-Sept. 1953. In Italian, with English summary (p. 370). DNLM

A spirographic method was used to study the pulmonary ventilation and oxygen consumption (while breathing atmospheric air and air containing 50% O_2) of 10 healthy subjects, 70 patients with pulmonary disease, and 10 cardiopaths in functional respiration, both at rest and during work. From the values obtained it was seen that in normal and pneumopathic subjects respiratory insufficiency is due to the onset of anoxic anoxia and is characterized by the following spirographic phenomena: (1) pulmonary hyperventilation which is reduced after respiration of hyperoxygenized air (potential deficit), and (2) low consumption of O_2, the value of which is increased by the respiration of hyperoxygenized air (present deficit).

3290
Patelina, V. V. 1952
[THE EFFECTS OF CONDITIONED REFLEXES ON THE BLOOD VESSELS AND ON RESPIRATION DURING INTENSE MENTAL ACTIVITY] Uslovnoreflektornye vliianiia na sosudy i dykhanie pri napriazhennoĭ umstvennoi deiatel'nosti. — Fiziologicheskiĭ zhurnal S.S.S.R. (Leningrad), 38 (5): 566-575. 1952. In Russian.
DLC (QP1.F57, v. 38)

Plethysmograms and pneumograms during intense mental exertion, such as are obtained during solving difficult mathematical problems, can be reproduced by reflex reaction to any kind of preceding "indifferent" stimulation. The temporary relationship between the two types of causes is of a rather firm character, since it requires no reinforcing stimulation. Extinction of the temporary connection occurs after 3 - 40 applications of conditioned stimulation without "reinforcement". In addition to the conditioned sound stimulator, which elicits the reflexes under consideration, it is possible to develop a differentiation after 8 - 14 applications of the differential stimulator, which is usually the sound of a buzzer. Individual differences are encountered. Close observation of the plethysmographic or pneumographic recording can easily discern such individual deviations, especially in the records of the formation and stability of the sense of differentiation. The procedure employed makes possible the study of the nature of interaction between the first and second Pavlovian signal systems.

3291
Paterson, D. G.,
P. G. Jenson, and G. W. England
THE MEASURED VOCATIONAL INTERESTS OF OFFICERS ASSIGNED TO POSITIONS IN THE PERSONNEL AND COMPTROLLER FIELDS. — Univ. of Minnesota. Industrial Relations Center, Minneapolis (Contract AF 18(600)337); issued by Human Resources Research Inst., Maxwell Air Force Base, Ala. HRRI Technical Research Report no. 21, Jan. 1954. iv+29 p. AD 31 967 PB114347

The responses of 1470 Air Force officers on the Strong Vocational Interest Blank were analyzed to provide information on the personality make-up of two specialty officer groups comprised of personnel officers and officers in the comptroller area. The measured vocational interests of the officers in positions of Personnel Director, Personnel Staff Officer, and Personnel Officer

were in the personnel, public administration, and office detail areas; no practical differences were found between the interests of the three levels. The measured interests of Air Force officers designated as Comptroller and Accountant-Auditor Staff Officer were similar to the total personnel groups; this suggested an Air Force officer type of interest pattern. None of the subgroups in the comptroller area had patterns which corresponded to their civilian counterparts, with the possible exception of the Accountant-Auditor Staff Officer's scoring on the accountant scale. Vocational interest measurements were considered an important area of personality assessment for developing an integrated officer personnel program.

3292
Patterson, J. L.,
A. Heyman, and L. L. Battey
THRESHOLDS OF RESPONSE OF THE CEREBRAL VESSELS OF MAN TO INCREASE IN BLOOD CARBON DIOXIDE. — Medical College of Virginia, Richmond (Contract Nonr-113401; in cooperation with Emory U. School of Medicine, Ga.); and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 050.01.09). Joint Project Report, Jan. 5, 1954. 7p. AD 37 054
UNCLASSIFIED

The cerebral vascular responses in man to inhalation of 2.5% and 3.5% CO_2 have been studied in 21 subjects. The findings are compared with those obtained by others with higher concentrations of carbon dioxide. The vasodilator response to increase in arterial CO_2 tension appears to be a threshold type of phenomenon. A mean increase in arterial CO_2 tension of less than 4.7 mm. Hg does not affect cerebral blood vessels; each increase above this value is associated with progressive vasodilatation. No data are available beyond an increase in pCO_2 of 14 mm. Hg. A mean increase in arterial pCO_2 of 5.5 mm. Hg produced a slight but, it is believed, physiologically significant vasodilatation. With constant cerebral metabolism a reduction in cerebral blood flow of approximately 30% would be required to raise end-capillary and venous CO_2 tension to the vasodilator threshold. It is probable that cerebral vessels dilate with a smaller reduction in blood flow, owing to the combined effects of increased pCO_2 and reduced pO_2. Carbon dioxide in 3.5% concentration has little effect on the blood pressure in most patients when inhaled for periods up to 30 minutes. It produces considerably less dyspnea than 5% CO_2 and may have applications in the treatment of certain states of cerebral vascular insufficiency. (Authors' summary)

3293
Pavlok, J.,
D. Čapek, O. Černoch, J. Štverák, V. Malčík, J. Mikula, and J. Čámský
[SPECIAL HYGIENE FOR AIRMEN] Speciální hygiena letce. — 175 p. Praha: Státní Zdravotnické Nakladatelství, 1954. (Vojenskozdravotnická knihovna, sv. 22) In Czech.
DLC (RC1062.P3)

Basic problems in aviation medicine are treated under five general topics: (1) effects of the external environment, (2) effects of the aircraft, (3) special problems of aviation physiology, (4) safety and escape measures, and (5) rescue service in aviation. The first part includes the physiology of anoxia, decompression sickness, aerotitis, aerosinusitis, aerodontalgia, bends, abdominal pain, and climatic stress. Physiological and technical means of protection from lack of oxygen, rapid changes in pressure, and cold are discussed. In addition, selection and training to raise hypoxia tolerance are mentioned. The second part describes motion sickness, effects of acceleration and deceleration, injuries caused by airplane noise and vibration, and toxic agents in the cockpit atmosphere. The design and instrumentation of the cockpit are analyzed from the human engineering viewpoint taking into consideration the limitations of the eye. Special problems of aviation hygiene include

prevention of flying fatigue, proper diet, active and passive training of the vestibular sense, and conditioning of the body and nervous system. The physiological and physical aspects of parachute jumping are summarized. The final chapter is devoted to emergency and rescue measures. (111 references)

3294
Pawel, N. E. R.,
R. T. Clark, and H. I. Chinn
CHANGES IN BRAIN BLOOD VOLUME DURING ACCLIMATIZATION TO HIGH ALTITUDE. — School of Aviation Medicine, Randolph Field, Texas. April 1954. 6 p. (Project no. 21-1201-0009, Report no. 4). AD 35 376 PB114289

The brain blood volume of rats increased by 11.7% during acclimatization to 18,000 feet. The systemic blood volume during the same period increased by 31%. The length, number, and diameter of capillaries in the brain were markedly increased. The capacity of the capillary bed was tripled after acclimatization. The discrepancy between brain and systemic blood increases during acclimatization is discussed. (Authors' summary)

3295
Payne, R. B.,
and G. T. Hauty
THE EFFECTS OF EXPERIMENTALLY INDUCED ATTITUDES UPON TASK PROFICIENCY. — Jour. Exper. Psychol., 47 (4): 267-273. April 1954. DLC (BF1.J6, v. 47)

Eighty subjects received preliminary training on a complicated compensatory pursuit task involving simulated aircraft instruments and controls, then continued work for 4 hr. after having been distributed among ten combinations of two motivational and five pharmacological conditions (administration of analeptics or depressants). The treatment effects were appraised in terms of subjective dispositions and task performance, and the functional connection between these outcomes was explored. Both motivational and pharmacological treatments induced divergent task dispositions. Motivational effects, however, were not discernible in performance. Large performance effects due to drugs could only slightly, if at all, be accounted for by subjective effects. It is postulated, that their effect is chiefly dependent upon interference with the metabolic processes, resulting in an enhancement of optimum physiological activity of the cell. These results tend to discredit the general practice of invoking attitudinal constructs to explain work-decrement phenomena in the absence of confirming experimental demonstrations. (Authors' summary, modified)

3296
Payrau
[NIGHT VISION] La vision nocturne. — Revue du Corps de santé militaire (Paris), 10 (4): 397-412. Dec. 1954. In French. DLC (RC970 R44, v. 10)

The uses of adaptometry and scotoptometry in pilot selection are presented with reference to night flying. In addition, the effect of systemic and ocular physiopathology on night vision is discussed along with means for the improvement of defective night vision.

3297
Pechoux, R. J. A.
[PRINCIPLES AND ORGANIZATION OF PRESELECTION OF THE CONTINGENT] Principes et organisation de la présélection du contingent. — Revue du Corps de santé militaire (Paris), 10 (2): 215-233. June 1954. In French. DLC (RC970.R44, v. 10)

A discussion is presented of the principles and organization of general and specific aptitude tests including those measuring intellectual, numerical, and spatial aptitudes, mechanical comprehension, perceptualization and interpretation of visual material. These tests along with a medical examination are of value in the selection of military personnel.

3298
Pecoraro, J. N.
THE USE OF AN OPERATIONAL FLIGHT TRAINER AS A RESEARCH TOOL FOR AIRCRAFT INSTRUMENTATION AND COCKPIT REARRANGEMENT. — Aeronaut. Engin. Rev., 13 (5): 86-93. May 1954.
DLC (TL501 A326, v. 13)

The progress made in the use of simulators in experimental research, particularly in the area of instrument design and cockpit layout, is reviewed. Various design methods for the simulator and the use of naive subjects in the evaluation experiments are discussed. Experiments evaluating attitude instruments in a simulator are described. In conclusion, the advantages of the use of an operational flight trainer in experimental research are summarized.

3299
Pellandini, J. 1953
[JEAN BOULET, TEST PILOT OF THE "MISTRAL", SAVED THANKS TO HIS EJECTABLE SEAT] Jean Boulet pilote d'essai du "Mistral" sauvé grâce à son siege ejectable. — Orion (Paris), 4 (1): 62-64. Jan.-Feb. 1953. In French.
DLC (UG635.F807, v. 4)

A brief commentary on the development of the parachute is presented. The possibility of pressurized ejection capsules and even of propeller-driven escape devices as a solution to the problem of escape from high altitude aircraft is suggested.

3300
Penman, J.
AIRMAN'S PTOSIS. — Lancet (London), 267 (6843): 873. Oct. 23, 1954.
DLC (R31.L3, v. 267)

This is a letter to the editor reporting a case of unilateral ptosis, dating from World War I, when the patient served as a fighter pilot. The ptosis had appeared after he had flown without the protection of a helmet and goggles. From a statement of the medical officer it is deduced that this condition and its cause were well known. A number of his fellow pilots got the same symptom in the same way, but, so far as he can recall, recovery was rapid and complete in every case except his own, in which there was no recovery. However, the writer has been unable to find any reference to this form of ptosis in medical literature.

3301
Penrod, K. E.
METABOLIC FACTORS IN OXYGEN TOXICITY. — Federation Proceedings, 13 (1[I]): 109. March 1954.
DLC (QH301.F37, v. 13)

At the 1953 Federation Meeting some evidence was presented implicating an abnormal oxidation of certain unsaturated fatty acids in the body as a possible metabolic factor in the toxicity of oxygen at high pressures. Extensive further experimentation along this line has failed to support the original hypothesis. The experiments have included observation on rats fed a diet high in unsaturated fatty acid (linolenic), rats force-fed or injected with irradiated unsaturated fatty acids and pure end products of oxidized unsaturated fatty acids, and guinea pigs having an excess or deficiency in the presumed principle catalyst for the reaction -- ascorbic acid. Of interest was the fact that, of the many substances tested for their effect on oxygen toxicity, an excess of ascorbic acid and an excess of glucose were the only ones which appeared to offer any protection. (From the author's summary)

3302
Pera, G., 1953
and A. Mangiacapra
[THE PREDISPOSITION TO FLIGHT ACCIDENTS TESTED BY THE SZÖNDI REACTION] La predisposizione all'infortunio aeronautico saggiata col reattivo di Szöndi. — Atti del V° Congresso de medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 441-448. In Italian, with English summary (p. 448).
DNLM (W3C0943a)

Thirty pilots, previously involved in many flight accidents due to human factors were tested by the Szöndi reaction (projective technique using pictorial stimuli) to ascertain whether or not a predisposition to flight accidents exists and to demonstrate its psychic characteristics. The following features were noted in most of the subjects: (1) poor control powers; (2) psychological conflicts; (3) neurotic orientation of personality, and, in some cases, (4) unexpressed paroxysmal or cyclic tendencies. These psychic conditions indicate the existence of a predisposition to flight accidents and the possibility of revealing it by means of the Szöndi test.

3303
Pera, G., 1953
and A. Mangiacapra
[THE PREDISPOSITION TO FLIGHT ACCIDENTS TESTED BY THE THEMATIC APPERCEPTION TEST] La predisposizione all'infortunio aeronautico saggiata col T.A.T. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 449-454. In Italian, with English summary (p. 454).
DNLM (W3C0943a)

In order to ascertain the psychic conditions which may predispose to flight accidents, twenty-five pilots previously involved in accidents due to human factors were given the thematic apperception test. Eleven subjects demonstrated a deep tendency to an affective overevaluation of hostile environmental forces and depressive underevaluation of their own hostile forces. In three subjects a deep euphoric complex (affective underevaluation of environmental forces associated with aggression and overactivity) was noted, and another two subjects exhibited deep psychotraumatic flight complexes. These findings indicate a predisposition to flight accidents and may be evaluated by the thematic apperception test. (Authors' summary, modified)

3304
(Personnel Research Center) 1953
THE HUMAN ELEMENT IN CONTROL TOWER OPERATION: A SITUATION SURVEY. — Personnel Research Center Inc., Detroit, Mich. (Contract AF 18(600)-470); issued by Air Research and Development Command. Human Factors Operation Research Labs., Bolling Air Force Base, Washington, D. C. HFORL Report no. 41, July 1953. xiii+79 p. AD 20 967 PB 113189

A situational survey of 12 Air Force control towers was made in an effort to obtain information about the demands and requirements of the job and to uncover details of problem areas. Results of an experimental trial of an on-the-job-training check list showed an interrater reliability of 0.81. A 6-item open-end questionnaire was presented to 99 control operators to obtain information about the job elements involved and to identify some of the characteristics required for effective performance on the job. A comparison between the questionnaire results of the Air Force control tower operators and the interview results of CAA control tower operators indicated differences between military and civilian situations. Relationships with pilots appear to be more of a problem in the military groups than in the CAA group. Results of an experimental trial of a job-attitude scale were compared with other information secured in the situation survey. Air Force control tower operators were found to have generally favorable attitudes toward their jobs as measured by this scale. Proficiency rankings were obtained for 177 control tower operators. These rankings were compared with other variables such as service test results and personal data. The results indicate that proficiency is a product of many factors. Information was obtained on the background and experience of the typical tower operator, the ability of experienced operators to handle multiple messages simultaneously, and the feelings that result from handling heavy traffic. (AD abstract)

3305
Pestalozza, G.,
and A. Lazzeroni
NOISE EFFECT ON SPEECH PERCEPTION IN CLINICAL AND EXPERIMENTAL TYPES OF DEAFNESS. — Acta oto-laryngologica (Stockholm), 44 (4): 350-358. July-Aug. 1954. In English
DNLM

Twenty subjects of both sexes with normal hearing, education, and intelligence were examined regarding the perception of speech in the presence of white noise in different "experimental" types of deafness, obtained by means of a special apparatus which allows the examiner's voice to be reproduced with various frequency cuts. In normal subjects, in cases of conductive deafness and also in experimental distortions with a rising audiometric curve, the noise produces an obvious threshold shift, which can be greater or lesser, but the perception score with increasing speech intensity can always arrive at 100% even in presence of noise. In perceptive deafness, on the contrary, and in experimental distortions with "sloping" audiograms, the perception score generally decreases as the intensity is increased; it is therefore merely a deceptive fact that noise is directly responsible for the decrease in the percentage of words correctly heard, for the results obtained with the same audiometric curves and the same experimental distortions in the absence of noise are substantially alike. In addition, noise produces a threshold shift which does not differ much from that found in normal subjects, while distortion, which is always present, is responsible for the difficulties produced by the lack of equilibrium in loudness sensation at low and high frequencies, and determines the decrease of the articulation score with the increase in intensity.

3306
Peters, R. W.
COMPETING MESSAGES: THE EFFECT OF INTERFERING MESSAGES UPON THE RECEPTION OF PRIMARY MESSAGES. — Ohio State Univ. Research Foundation, Columbus (Contract N6ONR-22525); and Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 27, Sept. 1, 1954. [11] p. (Project no. NM 001 064.-01.27). AD 50 291 PB 116526

Listeners heard two simultaneous messages under instruction to respond to a designated primary message. The variables under study involved six types of interfering messages, and either (a) a delay of 0.30 sec. or (b) no delay in the onset of the primary message as compared to the onset of the interfering message. The results indicated that for the types of messages considered, listener reception is most adversely affected when the interfering message is similar to the primary message in phonetic content and temporal pattern. The delaying of the onset of the primary message relative to the onset of the interfering message, as compared to simultaneous reception of the two messages, reduces listener reception of the primary message. (From the author's summary)

3307
Peters, R. W.
THE EFFECT OF ACOUSTIC ENVIRONMENT UPON SPEAKER INTELLIGIBILITY. — Ohio State Univ. Research Foundation, Columbus (Contract N6-ONR-22525); and Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 26, Aug. 30, 1954. [7] p. (Project no. NM 001 064.01.26). AD 47 497 PB 116233

Speakers read lists from multiple-choice intelligibility tests while simultaneously hearing one of six acoustic signals. The six types of interfering acoustic signals presented to the subjects were selected to represent types of material which would be in the listening environment of speakers in various military communication situations. Mean intelligibility values for the speakers reading under the different acoustic circumstances were determined from listener responses to the

reading of the lists. The results of the experiment indicated that speakers were significantly more intelligible when the distractions which they were hearing while reading were either nonsense words or words similar to those being read than they were when words heard simultaneously were the same words or meaningful words unrelated to those being read. (From author's summary)

3308
Peters, R.W.
THE EFFECT OF HIGH-PASS AND LOW-PASS FILTERING OF SIDE-TONE UPON SPEAKER INTELLIGIBILITY. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr 22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 25, Aug. 16, 1954. 3+4 p. (Project Report no. NM 001 064.01.25). AD 46 696 PB 116232

Forty-eight subjects each read 12 multiple-choice intelligibility test lists (OSRD Report no. 5567) under various conditions of low-pass or high-pass frequency filtering of side-tone. A total of 298 listeners in 12 listening panels received the voice signals at a sound-pressure level of about 95 db. through Permoflux PDR-3 receivers under a free-field environment of 114 db. of recorded propeller-type aircraft noise. The mean intelligibility scores of speakers increased when frequencies above 600 c.p.s. were attenuated in the side-tone channel. (AD abstract)

3309
Peterson, A. P. G., 1953
and L. L. Beranek
HANDBOOK OF NOISE MEASUREMENT. — iv + 102 p. Cambridge, Mass. General Radio Company, 1953.
DLC (QC243.P45)

Measurements of sound and sound-pressure levels by electronic means are discussed. Applications of this technique are described in sections on loudness, speech interference, hearing damage, and noise source characteristics and control. The decibel system and the mechanism of hearing are also considered.

3310
Petit, E. 1953
[THE PHYSICAL TRAINING OF FLYING PERSONNEL: POINT OF APPLICATION] L'entrainement physique du personnel navigant: point-fixe. — Forces aériennes françaises (Paris), no. 81: 340-349. June 1953. In French.
DLC (UG635.F8F66, no. 81)

Athletic tests involved in the International Military Aeronautical Pentathlon are discussed. The events which comprise the test, including fencing, pistol-shooting, basketball, swimming, and the evasion course, are shown to be valuable in the development of qualities useful to the airman.

3311
Pettit, W. A. 1953
OPHTHALMOLOGICAL PROBLEMS IN AVIATION MEDICINE. — Contact (Pensacola), 11: 14-21. 1953. DNLM

A discussion is given of the physical conditions which prevail in high-altitude and high-speed flight, and of the physiological variables which are most likely to be affected by these conditions. The physical conditions include distance, visibility changes which accompany changes of altitude, environmental illumination and cockpit lighting, shape, transparency, and smoothness of canopies and windscreens (which may cause prismatic aberrations or depth perception distortions), and, finally, angular acceleration with accompanying stresses upon the eye and head muscles causing displacement of the field of vision and perhaps disorientation of the pilot. The manner in which the external and internal eye (especially the retina), and extra-ocular muscles react or adjust to prevailing physical conditions is discussed. The effects of anoxia and fatigue upon vision are also treated.

3312
Petrovykh, V. A. 1953
[FOOD HYGIENE OF FLIGHT PERSONNEL OF THE CIVIL AIR FORCE. MOSCOW, 1953] Gigiena pitaniîa letnogo sostava grazhdanskogo vozdushnogo flota, M. 1953. — Voprosy pitaniîa (Moskva), 13 (5): 58. Sept.-Oct. 1954. In Russian. DLC (QP141.A1V6, v. 13)

This is a review of a 40-page brochure on above topic, by T. V. Dolbin. According to the reviewer, only 11 pages of the pamphlet are devoted to a discussion of the nutritional requirements of civilian flight personnel, and the discussion itself is wanting in that certain phases of nutritional requirements related to civilian flight personnel as considered from a viewpoint of physiology and hygiene have been neglected. Thus, in the chapter, "Food Requirements at High Altitude Flights", Dolbin discusses oxygen insufficiency as the basic determining factor, despite the fact that the practice of pressurizing high altitude flights reduced the condition of oxygen insufficiency practically to nil. Dolbin neglects to mention that gas-producing foods had better be abstained from for a period of at least 24 hours before taking off. In the chapter, "Nutrition During Night Flights", Dolbin recommends the adoption of certain diets during the early hours following the night flight, which, in essence, are not part of the "night flight". Conspicuously lacking is a discussion of dietary or nutritional requirements of civilian flight personnel during cold and warm seasons of the year. Statements made by Dolbin concerning the high assimilability of fats and carbohydrates in any proportional ratios are contrary to the results obtained by I. P. Razenkov and O. P. Molchanova, who showed that the assimilability of dietary components depend upon the predominance in the rations of proteins and carbohydrates.

3313
Pezzani, G.
[USE OF THE HELICOPTER FOR MEDICAL ASSISTANCE] L'elicottero per l'assistenza sanitaria. — Rivista di medicina aeronautica (Roma), 17 (2-3): 186-190. Apr.-Sept. 1954. In Italian. DLC (TL555.A1R5, v. 17)

It is suggested that helicopters could be of invaluable assistance in providing quick medical attention to persons in outlying regions. The "flying doctor" system is cited as being used in Canada and Australia, where it is possible to provide medical aid to populations hundreds of miles away from inhabited centers, and where the only rapid means of transportation are airplanes or helicopters. The latter are preferable because they do not require a landing area, and a doctor could learn to operate a helicopter without too much difficulty. An Italian counterpart of the "flying doctor" system is strongly recommended. Tables are presented showing Italian hospital centers and the radii (in km.) of their jurisdiction. The shortest radius is 32 km., the greatest 120 km. It is proposed that attempts be made to win over public opinion to this system by various means of mass communication, and that physicians obtain helicopter pilots' licenses.

3314
Pfingstag, C. J. 1953
PILOT'S ABILITY TO SIMULATE AN EMERGENCY ESCAPE WITH VARIOUS TYPES OF EJECTION SEATS WHILE SUBJECTED TO A FLUCTUATING ACCELERATION. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Letter report, Nov. 3, 1953. 3 + 3 p. (Project TED no. ADC AE-6303). AD 54 281 UNCLASSIFIED

To determine some of the difficulties a pilot experiences in operating an ejection seat under emergency conditions, three types of seats (Air Force "arm rest" upward, Air Force "D-Ring" downward, and Navy "face curtain" upward) were tested by Air Force and/or Navy pilots in full flight gear while subjected to a fluctuating acceleration on the Aviation Medical Acceleration Laboratory Human Centrifuge.

The advantages and disadvantages of each type are enumerated. It is concluded that performance may be improved on all seats by training and practice. The following modifications on the seats are suggested: (1) that the catapult stroke be shortened to 52 in. and ejection force increased for 60 ft./sec. ejection velocity, and (2) that they have the "D-ring" on the leading edge of the seat bucket as a pre-ejection and firing mechanism.

3315
Pickford, M.
RESPIRATORY ADAPTATION. — Lancet (London), 267 (6850): 1225-1226. Dec. 11, 1954. DLC (R31.L3, v. 267)

The frequent occurrence of emergencies at high altitudes resulting from machine failure, make it necessary to know the degree to which man can adapt to and endure environmental extremes. Investigation of adaptational mechanisms operating in adaptation to muscular exercise, shows not only high performance in an athlete accompanied by increased efficiency of breathing and circulation, but also a change in oxidative processes of the muscle allowing it to do the same amount of work on less O_2. Due to accumulation of lactic acid in the blood, some degree of anoxia, increased body temperature, and possibly reflexes from the active muscles and cerebral cortical stimuli, the respiratory center develops a lowered threshold to CO_2 during exercise. Addition of 66% O_2 improves performance and diminishes subjective feelings of fatigue. Breathing of pure oxygen, however, is detrimental, as the exercise cannot be maintained as long, and the subject feels uncomfortable. It is thought that the discomfort is due to the central nervous system being exposed to high concentrations of oxygen. As a result, the hemoglobin passing through the brain may not be reduced and therefore the buffering capacity of the blood may be impaired, so that a small increase in tissue CO_2 occurs, which, plus the high O_2, may disturb the central nervous system. It is concluded that the duration of work seems to depend on available O_2, carbohydrate, and water more than on pulmonary and cardiovascular capacity. The final limiting factor seems to be the central nervous system. If slight anoxia reduces the threshold of the respiratory center to CO_2, it is of prime importance to keep the CO_2 concentration of enclosed environments at low barometric pressures.

3316
Pié, A. 1953
[EFFECTS OF HYPERVENTILATION FOLLOWED BY APNEA ON THE ELECTROENCEPHALOGRAM] Efectos de la hiperventilación seguida de apnea sobre el E. E. G. — Revista Española de fisiología (Barcelona), 9 (2): 115-120. June 1953. In Spanish, with English summary (p. 120).
DNLM

The following electroencephalographic changes were noted in subjects exposed to hyperventilation followed by apnea: (1) curves modified by hyperventilation returning to normal during apnea; (2) increase in beta rhythm during apnea, and (3) increase during apnea of the unstable delta rhythm demonstrated in hyperventilation.

3317
Pimentel, D.,
and J. W. Klock
DISINSECTIZATION OF AIRCRAFT BY RESIDUAL DEPOSITS OF INSECTICIDES. — Amer. Jour. Tropical Med. and Hyg., 3 (1): 191-194. Jan. 1954. DLC (RC960.A53, v. 3)

Field tests with free-flying house flies and mosquitoes in passenger aircraft have shown that Lindane residues of 200 mg. per square foot will satisfactorily disinsect baggage compartments for five weeks with a single application. These dosages are objectionable in passenger cabins because of spotting, but Lindane residues of 50 and 70 mg. per square foot are not objectionable in this respect, and these were

effective in cabins for one to three weeks, respectively. DDT and Dieldrin residues applied at reasonable dosages were found to be inferior to Lindane deposits for aircraft disinsectization. (Authors' summary)

3318
Pingree, F. deW.,
H. E. Sawyer, and R. G. Walden
AN EXPERIMENTAL AIR-SEA-RESCUE DRIFT BUOY. – Woods Hole Oceanographic Institution, Mass. Unpublished Manuscript. Reference no. 54-21, March 1954. 56 p. (Contract Nonr-769(00)). AD 42 149 PB 116335

This report contains information for the manufacture, maintenance, and use of a droppable, emergency radio equipment designed to facilitate the locating of conscious or unconscious survivors of naval aircraft or vessels abondoned at sea. When mechanically or manually launched, this device will automatically transmit keyed, tone-modulated signals on the UHF guard channel of 243 megacycles for a period exceeding 60 hours. These signals can be received at a maximum over-water distance of about 40 miles by an airborne AN/ARC-27 Transmitter-Receiver and homed on by the associated AN/ARA-25 Direction-Finding Adapter. Equipped with a pneumatic float, the Air-Sea-Rescue Drift Buoy will have under varying conditions of wind and ocean surface current almost exactly the same rate and direction of drift as standard U.S. Navy aircraft rafts when normally loaded and retarded by sea anchor. The bouy, on impact with the water, displays a dye marker and a small incandescent light to assist the pilot of a distressed aircraft to ditch near it, and to enable raftsmen to locate the buoy and take it in tow. This unit, weighing 14.5 pounds, may be stowed and ejected by any of the racks accommodating the Listening Sonobuoy AN/SSQ-2. It will function in small or large bodies of fresh water and can be put into operation by survivors of a forced landing ashore. (From the authors' abstract)

3319
Pizzuti, G.
[SOME SCIENTIFIC AND TECHNICAL CRITERIA FOR THE SELECTION AND ORIENTATION OF PERSONNEL IN THE ITALIAN AIR FORCE] Alcuni criteri scientifici e tecnici nella selezione e l'orientamento professionali del personale volontario delle A. M. – Rivista di medicina aeronautica (Roma), 17 (2-3): 257-265. April-Sept. 1954. In Italian, with English summary (p. 264).
DLC (TL555.A1R5, v. 17)

The psychological basis for selection methods of pilots, specialists, and non-commissioned officers in the Italian Air Force, is briefly discussed. Psychological requirements may be expressed by personality profile, which would contain such characteristics as endurance, rapid and precise sensory perception, rapid and exact muscular movements, rapid and persistent power of attention and concentration, a good general and practical intelligence, emotional balance, a firm and valiant character, a sense of responsibility and honesty, a humane attitude, and, finally a capacity for easily adjusting to any given social enviroment. Different test methods should be devised for professional categories in aviation—pilots, navigators, etc. Close cooperation between physicians, engineers, and pilots is to be most urgently recommended. The paper concludes with a brief outline of administrative aspects as they apply to the Italian Air Force.

3320
Placidi, T.,
and R. Biojout
[LACK OF DISCIPLINE IN FLYING] L'indiscipline en vol. – Médecine aéronautique (Paris), 9 (4): 455-460. 1954. In French.
DLC (TL555.M394, v. 9)

About 10% of the flight accidents caused by pilot errors are attributable to lack of discipline. It appeared of interest to study the psychological factors underlying this behavior. This lack is always conscious and not the

result of ignorance or inadequate training. Although it is a complex psychological phenomenon, it may have intellectual or characterological motivation. Intellectual indiscipline is generally due to jauntiness, negligence, inattention or forgetfulness and manifests itself in faulty readings of the instruments, disobeyance of instructions, and errors of judgment. Another psychological type are the pilots who lack self-confidence and try to overcompensate their inferiority complex by exhibiting too risky attitudes. In this case the lack of discipline is caused by subconscious factors, which may be aggravated by unsatisfactory family or social relations or lack of professional integration. If the pilot survives an accident caused by lack of discipline, he, generally, is removed from flying duty. From the viewpoint of the air training psychologist it appears possible and desirable to restore him to his rank after a period of rest and adequate psychotherapeutic treatment. Examples of each category of lack of discipline are given.

3321
Placidi, T.,
C. Boisbourdin, and J. de B. de la Roche
[SELECTION OF FLYING PERSONNEL: PSYCHOTECHNIC RESULTS AND PSYCHOLOGICAL PERSPECTIVES] La seléction du personnel navigant: Résultats psychotechniques, perspectives psychologiques. — Médecine aéronautique (Paris), 9 (2): 101-113. 1954. In French.
DLC (TL555.M394, v. 9)

The article is based on tests undergone by more than 1000 student-pilots of the French Air Force who had been admitted to training schools in the U.S.A., Canada, and Marrakech (Morocco). It describes in detail results of the psychological examination, especially the written tests of motivation, aptitude, and spatial orientation and the psychomotor test. In the authors' opinion, the tests are too scholarly, too academic, and too traditional. The tests should not be purely negative, i.e., aimed at elimination of the unfit, but positive, i.e., aimed at discovering pilots with superior abilities. It appears especially desirable to give the psychological methods of examination the same importance as the traditional ones. Psychological selection must be followed by standardized theoretical and practical instruction, especially flying tests. Finally, the aptitude of a fighter pilot cannot be separated from social connotations. The fighter pilot lives a dangerous life and, therefore, has the need and desire of belonging to a congenial group. The "group aspect" has acquired ever greater significance in behavior patterns. Therefore, to restrict the tests to psychological laboratories could have serious consequences. "Field work" is the real test.

3322
Placidi, T.,
E. Ducros, R. Biojout, and J. Tosan
[INJURIES IN FLIGHT ACCIDENTS OF THE AIR FORCE DURING 1950 TO 1952] Traumatologie des accidents aériens survenus dans l'armeé de l'air en 1950, 1951, et 1952. — Médecine aéronautique (Paris), 9 (2): 115-132. 1954. In French.
DLC (TL555.M394, v. 9)

In the first part, statistical data on flight accidents in the French Air Force are discussed from a technical and medical viewpoint. The second part summarizes the conclusions drawn from investigations of flight accidents with regard to the type, frequency, and gravity of injuries. An attempt is made to evaluate the effectiveness of various protective devices at the disposal of flying personnel. The outstanding facts of flight traumatology are summarized as follows: (1) The number of deaths (292) was greater in any one year under consideration than that of the non-fatal injuries (total, 213). (2) Most frequently observed were, (a) deaths —multiple lesions (40%),

mangled bodies (24%), charring (22%), injuries confined to head (10%); (b) injuries--multiple lesions (21.5%), head injuries (18.3%), injuries of the lower limbs (18.3%), face wounds, lacerations of inferior limbs, and burns (about 10% each). (3) The high percentage of head injuries (45%) is emphasized. (4) Among the accidents suffered by jet-fighter pilots, the number of multiple lesions and mangled bodies was much greater than among the piston engine fighters, while head injuries were less frequent. As far as protection is concerned, the most conspicuous fact is the ineffectiveness of seat straps and the necessity to revise the seat construction so as to allow the flier to turn his back in the flight direction, if an accident is imminent.

3323
Placidi, T.,
C. Boisbourdin, and J. de Brisson de la Roche
[COMPARATIVE VALIDITY OF PSYCHOTECHNICAL AND CLINICAL METHODS OF PILOT SELECTION] Validité compareé des méthodes psychotechniques et cliniques dans la sélection des pilotes. — Medécine aéronautique (Paris), 9 (4): 461-468. 1954. In French. DLC (TL555.M394, v. 9)

There is a good correlation between the results of American psychological pilot selection tests and subsequent performance of pilot candidates. Thus the costly training of candidates whose performance would not be satisfactory can be avoided. Specifically, the tests, which have an outstanding predictive value, are tests of motivation and comprehension of aeronautic problems; those of less value are abstract intellectual performance and general intellectual aptitude tests. The clinical method of character testing appears to be less effective than the psychological selection test battery. The character and sociometric evaluation of the candidates is done best during the flight training. The test methods used in the U.S. Air Force are compared with those applied in the French Air Force; the latter, though based on the American experience, have incorporated improvements in some respects.

3324
Plas, F.,
and J. Bourdinaud
[FUNCTIONAL EXAMINATION OF THE CIRCULATORY SYSTEM OF COMMERCIAL AVIATION PILOTS] L'examen fonctionnel de l'appareil circulatoire des pilotes de l'aviation commercial. — Médecine aéronautique (Paris), 9 (4): 427-443. 1954. In French. DLC (TL555.M394, v. 9)

Organic and functional heart integrity must not be confused. A heart with a definite organic defect may function satisfactorily, by way of compensation, while a heart seemingly without defect may show defective reactions in function. Flight personnel must have a cardio-vascular system that is both organically and functionally sound. The author describes now the various tests by which the proper function of the cardio-vascular system may be examined: (1) The Flack endurance test shows the heart reaction to high pressure in the right heart cavities. (2) Electrocardiograms taken before, during, and after physical effort demonstrate cardiac insufficiency. (3) The anoxemia test determines the adjustability of the heart to high altitudes. (4) The step-test of Martinet is a good measure of cardiac fatigue. After describing these tests the author discusses briefly the functional exploration of the cardio-circulatory system at advanced age. Since there exists no fixed age for retirement, the tests often reveal vascular disturbances and high blood pressure. Varicose veins, while often of little import for flight personnel, may become the source of severe phlebothromboses or of pulmonary embolism.

3325
Plas, F.,
and J. Bourdinaud
[PRACTICAL SIGNIFICANCE OF

PARTIAL RIGHT HEART BLOCK: ITS PATHOGENIC SIGNIFICANCE] Intérêt pratique des blocs droits incomplets: leur valeur pathogenique. — Médecine aéronautique (Paris), 9 (4): 449-453. 1954. In French.
DLC (TL555.M394, v. 9)

Incomplete right heart block, occasionally observed in the electrocardiogram, is considered by some specialists an oscillographic curiosity and by others a pathologic symptom requiring the grounding of the flier. The paper discusses the question whether this cardiographic peculiarity is sufficient reason for making such a grave decision. While the complete or Wilson block signifies a pathologic condition which requires the grounding of the flier, in case of the incomplete block a thorough heart examination should be made. If the heart is otherwise normal, the incomplete right heart block is no sufficient reason for grounding.

3326
Plas, F.,
and J. Curveillé
[BLOOD PRESSURE REACTIONS DURING THE FLACK TEST] Les réactions tensionnelles au cours du test Flack. — Médecine aéronautique (Paris), 9 (4): 445-448. 1954. In French.
DLC (TL555.M394, v. 9)

Sixty fighter-pilot candidates, 18-22 years of age, were subjected to a somewhat modified Flack test. Disregarding one abnormal subject, the remaining 59 subjects could be divided into two groups. In both groups the arterial pressure minima rose rapidly; in the majority of the subjects, the maximum pressure also rose parallel with the minimum pressure, whereas in a minority the maximum pressure rose only after an initial decrease. The possible significance of the two reaction types is briefly discussed.

3327
Platonov, K.
[THE INDIVIDUAL PECULIARITIES OF STUDENT PILOTS MUST BE STUDIED MORE THOROUGHLY] Glubzhe izuchat' individual'nye osobennosti kursantov-pilotov. – Kryl'ia rodiny (Moskva), 5 (10): 10. 1954. In Russian.
DLC (TL504.V683, v. 5)

The writer, a doctor of medical sciences, offers certain recommendations, which seemingly contain nothing new of which experienced and thoughtful pilot instructors have not been aware all along. He states, for instance, that the instructor must carefully note all errors a student-pilot commits and analyze them in relation to the individual make-up of the student. He must learn to distinguish between accidental and habitual errors, and must be able to correctly determine means and methods by which the student errors can be prevented from recurring. The instructor must train himself to keep objectively written records of the errors of his students as individuals and as a group. Older pilot instructors must have conferences with younger instructors and give the latter the benefit of their years of experience, and be of assistance to them in any other possible way.

3328
Platt, B. S.,
and R. H. Fox
THE PROVISIONING OF EXPEDITIONS IN THE FIELD: PLANNING FOOD SUPPLIES FOR TROPICAL EXPEDITIONS. — Proc. Nutrition Soc. (London). 13 (1): 53-60. 1954.
DLC (TX501.N9, v. 13)

The physiological basis for special dietary requirements in the tropics is discussed. The production of sweat, reduction in the heat of metabolism, and anorexia are some of the physiologic changes mentioned which occur under heat stress. Nutritional planning must be accommodated to meet these changes. A sufficient intake of water and salt to compensate for loss in sweat is essential. Food, particularly that which is processed or dehydrated, must be skillfully prepared in order to ensure the adequacy of food intake,

although metabolic requirements are slightly decreased. Maintenance of body weight and a minimum urinary output of two pints a day may be utilized as criteria of adequate nutrition.

3329
Poe, A. C.,
and R. K. Ambler
THE EVALUATION OF A FORCED CHOICE RATING FORM FOR DETERMINATION OF THE LEADERSHIP POTENTIAL OF PREFLIGHT NAVCADS. — Naval School of Avaition Medicine, Pensacola, Fla. April 7, 1954. 12+15 p. (Project Report no. NM 001 058.16.04). AD 35 120 UNCLASSIFIED

Two equivalent forced-choice description forms were administered to 372 Naval aviation cadets to determine their value in identifying the leadership potential of their fellow cadets. Part I of each form consisted of complimentary descriptive phrases from which the rater selected two phrases from each block of four that best fitted the person rated. Part II consisted of derogatory phrases from which the rater selected two that least fitted. The forms were scored by pattern-analysis keys derived from a previous population. The criterion, numerical standard scores for military leadership, was the consensus of all the peer nominations made by the members of a section. A composite score of Part I of both forms correlated 0.56 with the peer nomination criterion. The rater-rater reliability was 0.56 for 2 raters and 0.72 for 4 raters. Form reliability was 0.83. Rater bias caused by criterion standing of the rater was not operative. Multiple regression was used to evaluate the forms relative to measures currently used in training. The general conclusion was that these forms are intrinsically good as measuring instruments. (AD abstract)

3330
Politzer, W. M.,
M. E. Barry, and A. King
THE EFFECT OF HEAT STRESS ON MINE WORKERS WITH REGARD TO LOSS OF WATER AND ELECTROLYTES. — South African Jour. Med. Sci. (Johannesburg), 19 (4): 155-160. Dec. 1954. DLC (R98.S6, v. 19)

The salt and water depletion was investigated in 81 South African miners working under conditions of high temperature and humidity (86°F. dry bulb, 84°F. wet bulb). No departures from the normal range of values in respect to serum chloride, urea, sodium, potassium, total protein, and packed cell volume levels were observed. Weight records indicated a mild temporary dehydration due to profuse sweating, but this fluid loss was soon replenished after work. Electrolyte determinations showed that sweat was not very diluted, contrary to expectations that this would be the case as a result of acclimatization. Since, it was determined that electrolyte and fluid loss is offset adequately by regular diet, supplementary salt tablets were not recommended. The author includes tables of blood pressure and blood analyses, and the chemical composition of sweat and urine.

3331
Polizzi di Sorrentino, A. 1953
[THE CURRENT VALUE OF TELECARDIOGRAPHY IN THE DETECTION OF HEART DISEASES] Il valore attuale della telecardiografia nella individuazione di cardiopatie. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 455-490. In Italian, with English summary (p. 487-488). DNLM (W3C0943a)

A review and evaluation is presented of the most common X-ray methods for examining the heart (radioscopy, orthodiagraphy, stratigraphy, roentgenokymography, angiography, cineradiography, radioplastography), with special emphasis on telecardiography. Comparative results are given of tests performed on 250 subjects (normal or with heart disease) using teleradiographic cardiometry or with nomograms

and calculations. Due to the high incidence of cardiovascular disorders in aviation medicine, it is recommended that systematic telecardiography be included in medical examinations prior to selection, and in periodic examinations of flight personnel.

3332
Pollack, I.
MASKING OF SPEECH BY REPEATED BURSTS OF NOISE. — Jour. Acoust. Soc. Amer., 26 (6): 1053-1055. Nov. 1954. DLC (QC221.A4, v. 26)

The masking of speech by a periodically interrupted white noise was examined over a wide range of noise levels, rates of interruption, and noise-time fractions. To a first approximation, the masking produced by an interrupted noise is a constant fraction of that produced by a continuous uninterrupted noise. The masking produced by an interrupted noise is primarily a function of the interval between successive noise bursts and is relatively independent of the noise-time fraction and the rate of interruption of the noise, except insofar as these determine the interval between noise bursts. The effect of interrupted noise on the loudness of speech was also examined. (Author's abstract)

3333
Pollack, I.
METHOD OF REPRODUCTION AND THE IDENTIFICATION OF ELEMENTARY AUDITORY DISPLAYS. — Jour. Acoust. Soc. Amer., 26 (6): 1060-1063. Nov. 1954. DLC (QC221.A4, v. 26)

The identification test commonly employed to examine auditory perception has been extended so that the stimulus step represented by the listener's response is fed back or reproduced to the listener. This condition, in turn, enables the listener to compare the original stimulus presentation with the stimulus based upon his response. The improvement in identification was only a fraction of that reasonably expected on the basis of a classical differential threshold analysis.

3334
Poos, E. E.
MECHANISM OF SUDDEN WEAKNESS, DIZZINESS AND SYNCOPE. — Jour. Aviation Med., 25 (3): 284-288. June 1954. DLC (TL555.A1A4, v. 25)

A general discussion of various physiological abnormalities which lead to weakness, dizziness, or fainting is presented. Included in the category of reflex vasodepressor syncope are psychic disturbances, drug effects, metabolic upset, tissue injury, dehydration, anoxia, blood loss, and high fever. The carotid sinus depressor reflex and postural hypotension are mentioned as other causes of fainting. Cardiac diseases, hyperventilation, hypoglycemia, hysteria, psychosomatic abnormalities are all given as causes of dizziness, weakness, or fainting. The author concludes that the above conditions are common in motorists and pilots, and contribute greatly to accidents.

3335
Porter, R. W. 1952
STRESS INDUCED CHANGES IN HYPOTHALAMIC ELECTRICAL ACTIVITY [Abstract]. — Anat. Record, 112 (2): 377. Feb. 1952.
DLC (QL801.A45, v. 112)

Recordings were made by means of electrodes placed in the brain stem and cerebral cortex of anesthetized cats and monkeys. In response to stresses of anoxia, to intravenous epinephrine, and to insulin, a marked increase in both frequency and amplitude of hypothalamic electrical activity occurred, continued at maximum for some time, and then diminished gradually to a preinjection level. These changes were confined chiefly to the posterior hypothalamus at the mammillary level; only minimal alterations were observed in the sensory and frontal areas of the cortex.

3336
Poulton, E. C. 1952
THE BASIS OF PERCEPTUAL ANTICIPATION IN TRACKING. — Brit.

Jour. Psychol. (London), Gen. Sect., 43 (4): 295-302. Nov. 1952.
DLC (BF1.B7, v. 43)

Tracking with a two-pointer display is more accurate than with a one-pointer display. In anticipating with a two-pointer display, speed cues can be used, in fact, early in practice they are the sole basis for anticipating. Later in practice learned or assumed course characteristics can be used in anticipating with both one-pointer and two-pointer displays, particularly with the former. The accuracy of perceptual anticipation depends principally upon the number of events antecedent to the prediction. The time over which the events are spread is of only secondary importance. The principal deficiency of a one-pointer display is that control movements cannot be apprehended directly in relation to the stimulus movement. For the greatest accuracy in tracking, control and stimulus movements must be presented for direct comparison in the same sense modality and in such a way that an immediate comparison is possible. The simple absence of stimulus-speed cues in one-pointer balancing was found to be a significant handicap, while the absence of a visual representation of the control movements was not a significant handicap.

3337
Poulton, E. C. 1953
THE EFFECT ON PERFORMANCE OF BREATHING PURE OXYGEN AT ATMOSPHERIC PRESSURE FOR A SHORT PERIOD. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A.P.U. 203/53, Oct. 1953. 6 p. AD-37 690 UNCLASSIFIED

A controlled experiment was performed to determine the effect upon a task involving immediate memory of breathing pure oxygen at atmospheric pressure for up to eight minutes. No effect was found apart from a chance interaction. (Author's summary)

3338
Powell, T. J.
ACUTE MOTION SICKNESS INDUCED BY ANGULAR ACCELERATIONS. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 865, Feb. 1954. 24 p. AD-39 215
UNCLASSIFIED

Forty-five blindfolded subjects were exposed to angular accelerations seated in a Barany chair rotating at 16 r.p.m. and flexing their heads in a controlled manner. A questionnaire was filled out by each subject, and his susceptibility to motion sickness was graded as 0, I, II, III (0-I — very occasionally motion sick; II — often motion sick, III — usually motion sick in the average short flight or sea voyage). Twenty-two of the subjects became severly nauseated during the test, and there was good correlation between their questionnaire grading on susceptibility and their susceptibility to experimental motion sickness. During the tests, recordings were made of the following variables: (1) revolutions of turntable, (2) sweating on forehead, (3) diving-climbing sensations, (4) lateral tilting sensations, (5) head movements, and (6) onset of nausea. A positive association was found between onset of sweating and onset of nausea. There was a secondary nausea lasting from 2 to 12 hours in all subjects who were severely nauseated in the tests. Despite the small number of subjects tested, it is considered that this test should be of value in confirming an individual's history of susceptibility to motion sickness, and, in a modified and extended form, in predicting an individual's response in flying.

3339
Pratt, L. W.
EQUILIBRATORY ILLUSIONS IN AVIATION. — Annals Otol. Rhinol. and Laryngol., 63 (4): 906-921. Dec. 1954.
DLC (RF1.A6, v. 63)

The author reviews the three equilibratory systems (ocular, vestibular, and proprioceptive) in regard to their function of producing common illusions

encountered in aviation. The following illusions are discussed and analysed as to the role of each system in creating the illusion: (1) unperceived motion, (2) unperceived banks, (3) coriolis reaction illusion, (4) the leans illusion, (5) underestimating the degree of bank illusion, (6) reversal of rotation — the "graveyard spin" — illusion, (7) opposite tilt in a skid illusion, (8) ascent on descent in tight spiral illusion, (9) diving during recovery from turn illusion, (10) oculogyral effect illusion, and (11) audiogyral effect illusion. The illusory states produced by vestibular activity, while flying, are the result of capricious stimulation of the labyrinthine apparatus, with normal but inappropriate responses resulting from it. Also, one of the important characteristics of the labyrinth is that stimulation of it, by motion, must proceed at a rate above a certain threshold value to cause any recognizable response at all. That aircraft move at rates both above and below this threshold value is a factor fundamental in producing many of the illusory states. It was concluded that the sensory responses in regard to aerial orientation are inadequate and unreliable. The only adequate devices for orientation in space are those mechanical devices which form a part of standard aircraft equipment and are designed to aid in flying blind. For proper equilibration, two of the three systems, (ocular, labyrinthine, and proprioceptive) must be intact and functioning. (Author's summary, modified)

3340
Pryor, W. W.,
and G. Marks
EVALUATION OF PULMONARY FUNCTION AFTER RAPID OR EXPLOSIVE DECOMPRESSION. — Jour. Amer. Med. Assoc., 156 (13): 1233-1235. Nov. 27, 1954.
DLC (R15.A48, v. 155)

It was not possible by conventional ventilatory studies to detect any evidence of altered pulmonary function in a group of normal subjects who had been repeatedly exposed to rather marked increases in intrapulmonic pressure associated with rapid or explosive decompression or with prolonged periods of positive pressure breathing. Under conditions in which there is chronic lung disease with obstruction of airways, such pressure changes might well have deleterious effects, but this problem has not been studied. The possibility of acute injury or severe hypoxia is present, however. This necessitates the provision of certain protective measures to be used in case of sudden loss of cabin pressure at very high altitudes. With the development of commercial aircraft that fly at these altitudes the problem of explosive decompression has become one of more generalized interest, since the group of persons who may be exposed to this h a z a r d will be much less restricted. (Authors' summary)

3341
Pugh, L. G. C.
THE EFFECTS OF OXYGEN ON ACCLIMATIZED MEN AT HIGH ALTITUDE. — Proc. Roy. Soc. (London), 143 (910): 14-17. Dec. 1954.
DLC (Q41.L7, v. 143)

The effects of oxygen on men acclimatized to altitudes above 22,000 ft. have been studied on the basis of the experience of mountaineers participating in expeditions to Mt. Everest. Prior experimental data had been available for altitudes up to 20,000 ft. from the Cho Oyu expedition in 1952, and up to 21,000 ft. from the Everest expedition in 1953. Experimental findings indicate that at lower altitudes, the extra weight of the oxygen equipment counterbalances the benefits of added oxygen. However, at higher altitudes (above 27,000 ft.) the use of oxygen is expected to double the climbing rate. With the addition of extra oxygen, the ventilation rate was reduced 20 to 40%. The effects of oxygen at a flow rate of 10 liters/min. only slightly exceeded those at a 4 liters/min. flow rate. The subjective effects of

oxygen were by far the most impressive. Roughly proportional to the concentration of inspired oxygen, the subjects experienced a relief of dyspnea and of heaviness and fatigue sensations in the legs. This relief was experienced in spite of the large increase in alveolar pCO_2 accompanying the reduction of ventilation. The author gives a summary of the experiences of climbers in the Everest expedition of 1953, as recorded on the spot or summarized from questionnaires.

3342
Pugh, L. G. C.
HEMOGLOBIN LEVELS ON THE BRITISH HIMALAYAN EXPEDITIONS TO CHO OYU IN 1952 AND EVEREST IN 1953 [Abstract]. — Jour. Physiol. (London), 126 (2): 38P-39P. Nov. 29, 1954. DLC (QP1.J75, v. 126)

The mean hemoglobin value of blood samples taken on Cho Oyu at 1,000 ft. during the first 8 weeks of the expedition, was 14.9 g./100 cc. in Europeans (range 14.1-15.5 g.) and 13.6 g./100 cc. in Sherpas (range 11.6-15.5 g.). Final values, obtained either at 17,500 or 15,500 ft. on the way down after the party had been living about 15 days at 19,000 ft. or over, was 20.3 g./100 cc. in Europeans (range 18.3-22.0 g.) and 19.0 g. per cent in Sherpas (range 17.6-20.0 g.). On Everest, the mean value of samples taken in the 9th and 10th weeks of the expedition at 21,200 or 13,000 ft., was 20.9 g. per cent in Europeans (range 19.3-23.3 g.) and 19.3 g. per cent in Sherpas (range 15.1-23.6 g.). Sherpas had significantly lower levels than Europeans, but there was no obvious relationship between hemoglobin and physical performance. Data on men who went above 25,850 ft. are also shown.

3343
Pugh, L. G. C.
THE PROVISIONING OF EXPEDITIONS IN THE FIELD: HIMALAYAN RATIONS WITH SPECIAL REFERENCE TO THE 1953 EXPEDITION TO MOUNT EVEREST. — Proc. Nutrition Soc. (London), 13 (1): 60-69. 1954.
DLC (TX501.N9, v. 13)

The dietaries of a typical postwar Himalayan expedition (Cho Oyu) and of the 1953 Mount Everest expedition are described. Food was obtained in the former case chiefly from local sources. Digestive disturbances resulting from the strange diets were noted, and at high altitudes anorexia and unusual cravings developed. A large proportion of the daily food intake consisted of sugared beverages. Low food intake was attributed to insufficient acclimatization to altitude, and to the unappetizing nature of the diet. Marked weight losses were recorded. It was decided in preparation for the 1953 Everest expedition to supplement the locally obtained diet with quantities of military type composite rations. Although more costly, the more attractive diet resulted in maintenance of food intake and body weight, and was therefore considered to be of value.

3344
Pugh, L. G. C. E.
TECHNIQUE EMPLOYED FOR MEASURING RESPIRATORY EXCHANGES ON MOUNT EVEREST, 1953 [Abstract]. — Jour. Physiol. (London), 123 (3): 25P-26P. March 29, 1954.
DLC (QP1.J75, v. 123)

In the collection of expired air during work, the subject starts the test carrying on his back an empty 1-2 lb. Douglas bag of 100, 200, or 300 liter capacity closed with an intestinal clamp. The bag is connected with a low-resistance valve box by a 2-ft. length of alkathene tubing (1 inch internal diameter) passing over the head. The subject, wearing a nose clip, holds the valve box in front of his face ready to insert the mouthpiece at a signal. After 5 min. work the signal is given to start collecting. This is done at the end of an expiration so that the subject has the next inspiration in which to place the mouthpiece in his mouth, and the assistant has this amount of time to remove the clamp from the neck of the bag. Expired air is collected until the bag is full, whereupon pressure builds up rapidly until further expiration becomes difficult. At a second signal at the end of

an expiration, the assistant clamps the neck of the bag, and the subject removes his mouthpiece. Time elapsing between the two signals is recorded by stopwatch. After the bag has stood for minutes to allow its contents to cool to near ambient temperature, the pressure of the expired air in the bag is measured with an aneroid manometer (calibrated in mm. of water from 0 to 150), and the volume corresponding to this pressure is read on a pressure-volume chart. After taking a sample for analysis, the clamp is released and a Casella thermometer is thrust as far as possible up the neck of the bag. The air is allowed to escape slowly and its temperaature is measured over 1 min. as it flows along the neck of the bag. Errors of temperature measurement are not likely to exceed 2-3° C. and will only affect the volume measurement to the degree of 1%. The fact that the last two or three respirations are made against increasing resistance may introduce a slight error in the measurement of minute volume, but this effect is negligible when such large bags are used. A portable Scholander Gas Analyzer in a fiber glass case completes the apparatus. (Quoted in part)

3345
Punsoni, C.,
and D. S. Nartsubha
AVIATION MEDICINE IN THAILAND. — Jour. Aviation Med., 25 (5): 466-469. Oct. 1954.
DLC (TL555.A1A4, v. 25)

From 1918 to 1931, the examination of pilot candidates for the Thai Air Force was under the supervision of the Red Cross Hospital. The examination was the same as that required for civilian pilots with the exception of a test for reaction time using the Reid machine. In 1932, the pilots' examination was placed under the supervision of the Army Medical Department; and in 1941, the medical department of the Royal Thai Air Force was formed. Since that date, the specialty of aviation medicine has grown rapidly in Thailand. The present medical standard requirements for military student pilots are given.

3346
Quinn, M., 1953
C. R. Kleeman, D. E. Bass, and A. Henschel
FURTHER STUDY OF SURVIVAL RATIONS WITH ADEQUATE WATER INTAKE. — [Quartermaster Research and Development Center.] Quartermaster Climatic Research Lab., Environmental Protection Branch, Lawrence, Mass., Report no. 205, March 1953. ii+17 p. ([Project nos.] 64-12-001 and 64-12-002). AD-8538
UNCLASSIFIED

Ten young, white, normal males lived in a constant temperature chamber at 75° F., 25 percent relative humidity for a period of 18 days, and were maintained on a nutritionally adequate diet during the first nine days. The subjects were evenly divided into two groups, (during the last nine days), and each man received approximately 900 calories and 1750 cc. of water daily. The calories were derived from 46.25 grams of protein, 70.36 grams of carbohydrate, and 51.09 grams of fat in the Protein Group; and 0.63 grams of protein, 116.0 grams of carbohydrate, and 51.60 grams of fat in the Non-Protein Group. There were similar losses of weight, fat, and water in the two groups, but dehydration was not a prominent feature of the experiment. There was no significant difference in nitrogen balance. The data suggested that the Protein Group lost less potassium but more sodium and chloride. Ketonuria was observed only in the Protein Group. The results indicated no appreciable difference in metabolic performance between the Protein and Non-Protein Groups receiving 900 calories and 1750 cc. of water daily, and between the respective groups receiving 800 cc. of water daily. The ingested protein was utilized primarily as a source of fuel. (Authors' abstract)

3347
Quinn, M., 1953
C. R. Kleeman, D. E. Bass, and A. Henschel
METABOLIC COMPARISON OF PROTEIN AND PROTEIN-FREE DIETS DURING RESTRICTED CALORIE AND WATER INTAKE. — [Quartermaster Research and Development Center] Quartermaster Climatic Research Lab., Environmental Protection Branch, Lawrence, Mass., Report no. 201, March 1953. ii+39 p. [Project nos.] 64-12-001 and 64-12-002). UNCLASSIFIED

Ten young, white, normal males lived in a constant temperature chamber (75°F., 25 percent relative humidity) for a period of 22 days and were maintained on a constant adequate diet. During the last nine days, their water intake was restricted to 800 cc. daily. The subjects were divided evenly into two groups; both groups received 900 calories daily. The calories were derived from 43.14 grams of protein, 70 grams of carbohydrate, and 51.09 grams of fat in the Protein Group; and 116 grams of carbohydrate, 51.60 grams of fat, and 0.17 grams of protein in the fat, and 0.17 grams of protein in the Non-Protein Group. The subjects were semi-ambulatory throughout the experimental period. The data revealed similar losses of weight, body fat, nitrogen, potassium, phosphorus, sodium, and chloride. Ketonuria was confined almost exclusively to the Protein Group. These subjects also manifested a greater loss of body water. The results indicated that added protein did not improve nitrogen balance and acted only as a source of energy under these conditions. (Authors' abstract)

3348
Rahn, H.
THE SAMPLING OF ALVEOLAR GAS. — In: (School Aviation Med.) Respiratory physiology in aviation, p. 29-37. Randolph Field, Tex. Sept. 1954. (Project no. 21-2301-0003). AD 49 179 PB 121739

The Haldane-Priestley technique of alveolar gas sampling has practical applications when spot tests are made, or in comparative studies when changes in CO_2 concentrations under two or more conditions are examined. A detailed description of an automatic alveolar gas sampler (end-tidal sampler) is presented. During inspiration the gas beyond the expiratory check valve represents the last part of the normal tidal volume; the mask pressure is negative and the balloon is filled with alveolar air. In another method the relationship between the arterial pCO_2 and the end-tidal CO_2 is established. The two components are continuously recorded over a long period, and when a stable value is noted, blood withdrawn from the radial artery is analyzed for gas. In still another method end-tidal samples from the oropharynx are trapped and compared with gas samples collected by the automatic sampler. When the various methods are compared with the Haldane-Priestley approach, it becomes evident that the latter presents too high CO_2 and too low O_2 values. The end-tidal sampler yields samples which approach closely the arterial pCO_2 values during rest. With regard to the variability of alveolar gas concentration it is ascertained that while alveolar pO_2 is a function of the barometric pressure, the pCO_2 is regulated by the body itself. This ratio may vary with each individual and with each moment. In male subjects there are individuals with a constantly high or constantly low alveolar pCO_2. In females the pCO_2 fluctuates with the changing hormone levels of the menstrual cycle.

3349
Rajsic, R.,
and P. Arnould
[MODIFICATIONS OF THE RESISTANCE TO OXYGEN DEFICIENCY IN THE GUINEA PIG AFTER ADMINISTRATION OF CENTROPNEIN AND CHLORPROMAZINE] Modifications de la résistance au déficit en oxygène chez le cobaye après administration

de centropnéine et de chlorpromazine. — Comptes rendus de la Société de biologie (Paris), 148 (1-2): 137-142. Jan. 1954. In French.

DLC (QP1. S7, v. 148)

Free-moving and fixed non-anesthetized guinea pigs were decompressed at a rate of 1000 m. per minute up to 12,000 m. in a decompression chamber. Intraperitoneal Centropnein administered 15 minutes prior to the experiment increased resistance to oxygen deficiency whereas intraperitoneal chlorpromazine administered 30 minutes prior to the test decreased the resistance.

3350

Rajsic, R.,

P. Arnould, and M. Lamarche

[MODIFICATIONS OF THE RESISTANCE TO OXYGEN DEFICIENCY AFTER ETANAUTINE ADMINISTRATION IN THE GUINEA PIG] Modifications de la résistance au déficit en oxygène chez le cobaye après administration d'étanautine. — Comptes rendus de la Société de biologie (Paris), 148 (15-18): 1479-1480. Aug.-Sept. 1954. In French.

DLC (QP1.S7, v. 148)

Anoxia was induced in non-anesthetized guinea pigs by decompressing them at a rate of 1000 m. per minute up to 12,000 m. Intraperitoneal administration of Etanautine, an anthistaminic, one hour prior to the induction of anoxia lowered their resistance to anoxemia.

3351

Ralli, E. P.

THE EFFECT OF CERTAIN VITAMINS ON THE RESPONSE OF NORMAL SUBJECTS TO COLD WATER STRESS. — In: Spector, H., and M. S. Peterson (ed.), Nutrition under climatic stress..., p. 81-90; discussion, p. 98101. Nat. Acad. of Sci.--Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453

PB 117996

A series of animal and human experiments regarding the influence of calcium pantothenate on the tolerance to cold water stress is related. The negligible effects of vitamin B_{12} on tolerance to cold stress, as compared to calcium pantothenate, were subsequently explained by a possibility of poor intestinal absorption of vitamin B_{12}. In adrenalectomized and intact rats a high intake of calcium pantothenate almost doubled the capacity to sustain swimming in water of 18° C. in comparison with adrenalectomized and intact controls on a regular diet. In human subjects exposed to cold water stress after six weeks therapy with calcium pantothenate, there was a decrease in the fall of eosinophils, and in the uric acid creatinine ratio after stress. The ascorbic acid level in blood was elevated and remained high after the stress for a considerable length of time following cessation of calcium pantothenate intake. It is thought that considering the important role of pantothenic acid in the tricarboxylic acid (Krebs) cycle, the amount of pantothenate available may increase the intrinsic capacity of tissue cells to respond to stress and decrease the dependency on stimulation through the adrenal cortex.

3352

Rambach, W. A.,

H. L. Alt, and J. A. D. Cooper

PROTECTIVE EFFECT OF HYPOXIA AGAINST IRRADIATION INJURY OF THE RAT BONE MARROW AND SPLEEN. — Proc. Soc. Exper. Biol. and Med., 86 (1): 159-161. May 1954.

DLC (QP1.S8, v. 86)

Rats irradiated with X-rays in a hypoxic atmosphere show a slightly higher cellularity and much greater rate of desoxyribonucleic acid synthesis in the bone marrow and spleen after 96 hours than rats irradiated at ground level. On the other hand, thirty hours of intermittent hypoxia preceding irradiation at low oxygen tensions does not give additional protection. A striking parallelism exists in the cellular reactions in the bone marrow and spleen following

irradiation, both at normal atmospheric pressures and at low oxygen pressures. Irradiation of animals at low oxygen pressures appears to reduce the biological effectiveness of 800 r. on the bone marrow to 600 r. (Authors' summary, modified)

3353
Ramón García Martín, J.
[CONCEPT OF AVIATION MEDICINE] Concepto de medicina aeronáutica. — Medicamenta (Madrid), 12 (258): 109-111. Aug. 21, 1954. In Spanish DNLM

A brief review is presented of the history and current status of aviation medicine. This field of medicine includes clinical and experimental studies on air sickness, recovery and protection of flight personnel, and selection of pilots. In addition, the concern of aviation medicine with general diseases caused by high altitudes is noted.

3354
Randel, H. W.,
and J. E. Ward
AIRCREW INDOCTRINATION IN THE AIR FORCE PARTIAL PRESSURE SUIT AND ACCESSORY EQUIPMENT: MEDICAL ASPECTS. — Jour. Aviation Med., 25 (6): 637-650. Dec. 1954.
DLC (TL555.A1A4, v. 25)

The medical aspects are discussed of an indoctrination routine for the purpose of familiarizing aircrew members with high-altitude protective equipment. Three pieces of equipment are necessary for an aviator in order to survive and function at altitudes above 63,000 feet; these are the K-1 helmet, the T-1 emergency partial pressure suit, and the C-1 automatic oxygen assembly with a high-pressure oxygen bottle. 147 subjects were indoctrinated in the use of this equipment; all were given a complete physical examination prior to indoctrination. The function of the separate components was explained to each subject, and then he was fitted with his suit and taught to breathe under pressure at ground level; a slow ascent to a simulated altitude of 65,000 feet followed, then rapid decompression from 40,000 to either 55,000 or 65,000 feet took place. Of the total number of indoctrinated personnel, 7 were disqualified for medical disabilities, and 14 others failed for various reasons during the actual test of the suit. The over-all failure rate was 14.2%.

3355
Rasin, S. D. 1953
[CHANGES IN THE BASIC NERVE PROCESSES OF DOGS AT LOWER ATMOSPHERIC PRESSURE] Zminy osnovnykh nervovykh protsesiv u sobak pri snyzhennomu atmosfernomu tysku. — Medychnyĭ zhurnal (Kiiv), 23 (2): 10-16. 1953. In Ukrainian.
DLC (R91.M426, v. 23)

Disturbances in the higher nervous activity develop in dogs following short-duration exposure to reduced atmospheric pressure in pressure chambers or upon ascent to high altitudes of Mount El'brus. Disturbances in the conditioned reflexes become manifest at air rarification equivalent to an altitude of 5000 meters. In one dog such disturbance in reflex activity disappeared within a 10-minute exposure to altitude; in another dog the disturbances disappeared only when the dog was brought down to an altitude of 1000 meters. Under conditions equivalent to 7000 meters the disturbances in the activity of conditioned reflexes are more pronounced. After a short exposure to such conditions two dogs began to show symptoms of diffuse inhibition, which lasted only a short time and gradually disappeared with the descent to normal pressure. Under the influence of prolonged hypoxia and under conditions of actual high-mountain altitudes, disturbances in the conditioned reflex activity of the dogs began to appear at considerably lower air rarification (2200 meters) and persisted for two days. At an actual mountain altitude of 4250 m., the disturbances were of a profounder character and persisted throughout the entire period of sojourn on the mountain at that altitude. Following the descent the disturbances in

the conditioned reflex activity of three out of four dogs completely disappeared, pointing to the fact that the disturbances were due to hypoxia and not to any other extraneous factor.

3356
Rautian, G. N.,
and V. P. Solov'eva
[THE EFFECT OF SURROUNDING LIGHT ON THE ACUITY OF COLOR DIFFERENTIATION] Vliîanie svetlogo okruzheniîa na ostrotu tsvetorazlichiîa. — Doklady Akademii Nauk S.S.S.R. Novaîa seriîa (Moskva), 95 (3): 513-516, 1954. In Russian.
DLC (AS262.S3663, v. 95)

The results of the investigation establish the high stability of the acuity of color differentiation, which is largely independent of the visual surroundings. No clearly expressed opinion prevailed on this subject heretofore; the assumption was that the external environment affects the sense of color differentiation.

3357
Rawnsley, A. I.,
and J. D. Harris
COMPARATIVE ANALYSIS OF NORMAL SPEECH AND SPEECH WITH DELAYED SIDE TONE BY MEANS OF SOUND SPECTROGRAMS. — Naval Medical Research Lab., New London, Conn. Report no. 248 (vol. 13, no. 9), April 27, 1954. iii+7 p., (Project Report no. NM 003 041.56.03). AD 36 613
UNCLASSIFIED

A delayed side-tone is defined as the sound of his own speech reaching a speaker's ear after a controlled delay interval. Subjects read a simple story first tape-recorded in the presence of a side-tone with a delay of 0.18 second and then repeated without a side-tone. The intensity of delayed tone was sufficient to mask the subject's voice at the moment of speaking. Analysis of recordings was undertaken only with those subjects whose speech was affected by the side-tone, i.e., showed stammering, stuttering, hesitation, or blocking. Recordings of a stuttered phrase and the same phrase spoken normally by the subject was analyzed spectrographically. In nearly every case, a phrase spoken in the presence of a side-tone is longer and more emphasized than it is in the absence of a side-tone. The frequency pattern of the word is very often dependent on what immediately follows. If a word is repeated, it resembles, in its first appearance, the word in isolation, but its repetition is more similar spectrographically to the word spoken in the same phrase without the side-tone. This shows the transition which the word undergoes in anticipation of its connection with a following word. (Authors' abstract)

3358
[Rayner, L. C. C.,
and A. H. Coombs]
CONTROLLED ATMOSPHERIC CONDITIONS: PLANT FOR INSTITUTE OF AVIATION MEDICINE. — Engineering (London), 177 (4591): 117. Jan. 22, 1954.
DLC (TA1.E55, v. 177)

A climatic research laboratory used for executing physiological tests on subjects working in various types of clothing in a controlled atmosphere (15° to 180° F.) is described.

3359
Redmond, R. F.,
L. J. Milch, W. W. Calhoun, and H. M. Sweeney
THE BIOCHEMISTRY OF TISSUE TRAUMA. VI. THE EFFECT OF CRUSHING INJURY ON PLASMA LIPIDS AND LIPOPROTEINS. — School of Aviation Medicine, Randolph Field, Tex. April 1954. iii+6 p. (Project no. 21-1601-0017, Report no. 6). AD 30 941
PB114271

Highly significant increases in plasma cholesterol, lipid phosphorus, and lipoproteins of the S_f 0-12, 12-20, and 20-100 classes [i.e. with a flotation rate between 0 and 12, 12 and 20, and 20 and 100 Svedberg units, (see Science, 111 (2877): 166-171, Feb. 17, 1950)] were observed following a localized

crushing injury to the lower portion of the right hind limp of the rabbit. An increase in cholesterol extractable from the injured tibialis anticus was also demonstrated. Serum potassium decreased as a result of the crush injury. The findings are comparable to those recorded for localized thermal trauma to the right hind limb of the rabbit. (Authors' summary, modified)

3360
Reedy, J. D.,
and G. L. Saiger
EVALUATION OF THE HARVARD STEP TEST WITH RESPECT TO FACTORS OF HEIGHT AND WEIGHT. — Army Medical Research Lab., Fort Knox, Ky. Report no. 140, June 10, 1954. 1+6 p. (AMRL Project no. 6-95-20-001). AD 32 878 UNCLASSIFIED

This report is concerned with the relationship between height and weight factors and scoring on the Harvard Step Test. Results of studies on Army trainees would seem to indicate that test scores are not appreciably affected by a combined height-weight factor or the height factor alone, but may be affected by the weight factor. Low scores in relatively heavy men may be due in part to the weight factor. (Authors' abstract)

3361
Register, U. D.,
and R. G. Bartlett
REGENERATION OF TISSUE NONPROTEIN SULFHYDRYL COMPOUNDS IN RATS AFTER EXPOSURE TO COLD AND RESTRAINT. — Proc. Soc Exper. Biol. and Med., 86 (4): 836-838. Aug.-Sept. 1954. DLC (QP1.S8, v. 86)

Adult female Sprague-Dawley rats were exposed to cold and restraint to effect a lowering of concentration of the total nonprotein sulfhydryl compounds (NPSH) in the liver. At the termination of this exposure the animals were divided into 2 categories (fasting and nonfasting) and were permitted to recover under normal laboratory conditions. During the recovery period animals were sacrificed at intervals to trace the rate of regeneration of the liver and kidney NPSH. In neither the fasting nor the nonfasting categories was there a significant regeneration of the liver NPSH in 8 hours. In the nonfasting, recovery was virtually complete in 16 hours and complete in 24 hours. In the fasting animals recovery was slower in the beginning and was not completed by 24 hours. The rate of loss of NPSH from the liver was considerably greater in these experiments than the rate of recovery. Exposure to cold and restraint appeared to lower the kidney NPSH. Recovery was completed in fasting and nonfasting animals in less than 8 hours, with a transient overcompensation in both categories. (Authors' summary)

3362
Reid, L. S.,
and J. G. Holland
THE INFLUENCE OF STIMULUS SIMILARITY AND STIMULUS RATE. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-146, May 1954. iv + 10 p. (RDO no. 694-37). AD-49 630
PB133521

The present study, third in a series investigating factors influencing the proficiency of complex task performance, sought to determine the role of similarity among the stimuli controlling the task performance. In view of previous negative findings, symbols in the form of simple geometrical figures were used in order to provide greater opportunity for the manipulation of this variable. Also under investigation was the manner in which stimulus similarity was related to two other variables, namely, rate of stimulus presentation and patterned versus random sequence of stimulus presentation. As in the two earlier experiments a visual discrimination motor task involving two components (i.e., a right-hand or basic component, and a left-hand or secondary component) was utilized. The results revealed that similarity among the stimuli of the two task components

led to a significant reduction in the proficiency with which the total task was performed. It was further demonstrated that the detrimental influence of stimulus similarity could be reduced by either patterning the responses of one task component, or decreasing the rate at which the responses had to be made. (Authors' abstract)

3363
Reid, R. L.
AN ILLUSION OF MOVEMENT COMPLEMENTARY OF THE HORIZONTAL-VERTICAL ILLUSION. — Quart. Jour. Exper. Psychol. (Cambridge), 6 (3): 107-111. Aug. 1954.
DLC (QP351.E95234, v. 6)

Blindfolded subjects moved a stylus held in the hand over a standard distance of 4.5 in. in a given direction. They then attempted to move the same distance in a direction at right angles to the first. Eight combinations of movements were investigated. The results reveal an illusion such that the extent of movements to left or right across the body is underestimated, while the extent of movements towards or away from the body in the mid-line is overestimated. The illusion applies to speed as well as extent of movement. Movement up or down in a vertical plane is equivalent to movement towards or away from the body in a horizontal plane. The interaction of this illusion with the well-known horizontal-vertical illusion of visual perception explains a failure to find any net illusory effect where lines visually displayed in different orientations were matched for length by unseen movements in similar orientations. Whether the visual and movement illusions simply co-exist or whether they are functionally related is not yet clear. (Author's summary)

3364
Reynafarje, C.,
N. I. Berlin, and J. H. Lawrence
RED CELL LIFE SPAN IN ACCLIMATIZATION TO ALTITUDE. — Proc. Soc. Exper. Biol. and Med., 87 (1): 101-102. Oct. 1954. DLC (QP1.S8, v. 87)

Six individuals taken from sea level to 14,900 feet altitude showed a normal red cell life span during the period of acclimatization. It is concluded that the increased red blood cell count, hemoglobin and hematocrit, and an increased total red cell volume in polycythemia secondary to altitude is due entirely to an increase in the rate of red cell formation. (Author's summary, modified)

3365
Reynolds, B.,
and J. A. Adams
PSYCHOMOTOR PERFORMANCE AS A FUNCTION OF INITIAL LEVEL OF ABILITY. — Amer. Jour. Psychol., 67 (2): 268-277. June 1954.
DLC (BF1.A5, v. 67)

Two groups of subjects were trained on the Rotary Pursuit Test, one with massed and one with distributed practice. Each group was subdivided into deciles on the basis of initial performance, and the learning curves of the various subgroups were compared. The form of the curves did not, for the most part, vary significantly with level of ability. There was a general tendency for lower deciles with both types of practice to show greater variability. The results of the experiment support the assumption that general laws of learning based on sample statistics hold throughout the range of learning ability. (Authors' summary, modified)

3366
Riedstra, J. W., 1953
and M. N. J. Dirken
ON PROPRIOCEPTIVE RESPIRATORY REFLEXES. — Acta physiologica et pharmacologica neerlandica (Amsterdam), 3 (1): 19-26. Oct. 1953. In English. DLC (QP501.A3, v. 3)

The effects of a sudden partial obstruction during inspiration, described by previous authors and ascribed by them to "proprioceptive respiratory reflexes" may also be provoked after bilateral section of the phrenic nerve and even in the dead animal. The out-

come of model experiments suggests that they are the result of the inertia forces accompanying breathing. (Authors' summary, modified)

3367
Riezler, W.,
F. Esper, and H. Meurers
[STIMULATION THRESHOLD ON THE HUMAN EYE AS A FUNCTION OF THE DURATION OF LIGHT IMPULSES AND THE WAVE LENGTH OF LIGHT] Die Abhängigkeit der Reizschwelle des menschlichen Auges von der Dauer der Lichtimpulse und der Wellenlänge des Lichtes. — Zeitschrift für Physik (Berlin), 137 (2): 238-255. March 1954. In German. DLC (QC1.Z44, v. 137)

The stimulus threshold of two retinal areas, fovea centralis (cones) and peripheral area (rods) in the dark-adapted eye was measured varying the duration and wave length of the light flash. In the duration study, the optimum wave length of light flashes was employed for both the extrafoveal and foveal areas. The minimum number of light quanta absorbed by the retinal cells for a light perception was determined for several durations of the light stimulus. The effective summation times were estimated as 0.25 sec. for the extrafoveal and 1.3 sec. for the foveal areas. The minimum number of quanta that had to be absorbed by the retinal cells for light perception was shown to depend on the wave length. Similarly, the amount of energy gained in absorbing light quanta is also dependent on the wave length of the light flash. The effective number for the excitation of the rods was found to be 5-6 quanta at a light flash of optimal wave length.

3368
Riggs, L. A.,
J. C. Armington, and F. Ratliff
MOTIONS OF THE RETINAL IMAGE DURING FIXATION. — Jour. Optical Soc. Amer., 44 (4): 315-321. 1954. DLC (QC350.O6, v. 44)

Reprint issued also as: Brown Univ. Psychological Lab., Providence, R.I. (Contract N7onr-358). AD 32 330 UNCLASSIFIED

Various methods of measuring eye movements (ophthalmographic method, motion picture recording, photoelectric recording, direct photography of the eye, etc.) are outlined briefly. A method utilizing a reflecting mirror mounted on a contact lens, combined with a phototube recording device, was selected by the authors as the most sensitive. The relation of steady fixation to small eye movements (tremor) which cause small excursions of the retinal image and impair visual acuity, was studied. The retinal image was observed to remain almost steady at fixation times not exceeding 0.01 second, after which the median extent of the retinal image motion progresses in linear function with the fixation time. Thus, fixation of one second causes a retinal image motion of 3 minutes of arc.

3369
Rigsby, E. P.
UTILIZATION OF PHARMACISTS IN THE AIR FORCE. — Military Surgeon, 115 (1): 48-51. July 1954. DLC (RD1.A7, v. 115)

The Air Force policy of relieving the physician, wherever practicable, of duties not directly related to the practice of medicine, has greatly fostered the use of pharmacists in fields other than pharmacy proper. The graduate pharmacist is well suited for jobs requiring an administrator with a scientific background slanted in the direction of the health supply field. Pharmacists may act as assistants and advisors in matters related to medical treatment facilities, supply distribution activities, research, medical material standardization, medical procurement, and industrial mobilization planning. Wherever feasible, the administrative responsibilities have been transferred from the physician to the pharmacist, thus allowing the former to devote more time to the treatment of patients.

3370
Riley, R. L.,
A. B. Otis, and C. S. Houston
RESPIRATORY FEATURES OF ACCLIMATIZATION TO ALTITUDE. —

In: (School Aviation Med.). Respiratory physiology in aviation, p. 143-157. Randolph Field, Tex. Sept. 1954. (Project no. 21-2301-0003). AD 49 179
PB 121739

The following four phases of respiratory adjustment to altitude were observed in subjects during exposure to simulated altitudes up to 22,000 ft.: (1) Period of lung washout—Subjects exposed to 22,000 ft. for 30 minutes displayed a mean alveolar pCO_2 value of 25 mm., while the alveolar pO_2 value was 36 mm.; effective ventilation was more than double the ground-level value; the exchange ratio of 1.2 indicated a 50% increase in CO_2 elimination. (2) Period of tissue washout—During a one-hour exposure to the same altitude, ventilation gradually decreased and at the same time the alveolar pCO_2 and pO_2 dropped; this behavior represented a compromise between the hypoxic stimulus and a hypocapnic inhibition; the alveolar exchange ratio fell until it almost reached a steady CO_2 exchange; upon return to ground level, without the anoxic stimulus, ventilation was less in the first 5 minutes than the original ground level value; tests carried out at 12,000, 16,000, 18,000, and 20,000 ft. proved that higher altitude induces greater ventilation, and the higher the initial rise in alveolar exchange ratio, the greater the decrease in pCO_2. (3) Period of base excretion—During prolonged acclimatization to altitude the blood buffer base (excess of fixed base over fixed acid in the blood) was reduced by selective excretion of fixed base and retention of fixed acid by the kidneys. (4) Regulation of tissue capillary pO_2 in acclimatization — The blood flow and hemoglobin concentration increased, raising the venous pO_2 and minimizing the drop of O_2 pressure between the arterial blood and the tissues.

3371
Riley, R. L.,
R. H. Shepard, J. E. Cohn, D. G. Carroll, and B. W. Armstrong
STUDIES ON GAS EXCHANGE APPLICABLE TO FLYING PERSONNEL: THE MAXIMAL DIFFUSING CAPACITY OF THE LUNGS. — Johns Hopkins Univ. and Hospital. Departments of Environmental Medicine and Medicine, Baltimore (Contract AF 18(600)-435); issued by School of Aviation Medicine, Randolph Field, Tex. Sept. 1954. 15 p. (Project no. 21-1201-0014, Report no. 3). AD 67 157 PB 117162

Maximal pulmonary diffusing capacity was estimated quantitatively in three subjects exposed to the combined stresses of hypoxia and exercise utilizing the low oxygen method. In the two younger subjects, the diffusing capacity rose sharply at levels of oxygen consumption between 600 and 1,200 ml. per minute. There was no further rise when oxygen consumption was increased than 2,200 ml. per minute. In the older subject, the diffusing capacity rose at values of oxygen consumption between 500 and 900 ml. per minute. These findings suggest that the maximal values for diffusing capacity were achieved, and that the maximal diffusing capacity was lower in the older subject. The data also suggest that the maximal diffusing capacity can be reached either by hard physical work or by moderate work in association with severe hypoxia. In addition, various physiological mechanisms affecting the behavior of the pulmonary capillary bed during exercise and hypoxia are discussed. (Authors' summary and conclusions, modified)

3372
Rišavi, A.
[AEROTITIS MEDIA] Aerotitis. — Vojnosanitetski pregled (Beograd), 11 (3-4): 100-109. March-April 1954. In Croatian, with English summary (p. 108-109).

The author discusses the etiology and physiology of aerotitis media emphasizing that permanent deafness is a rather frequent sequel despite the intensive treatment. Introduction of air into the middle ear by catheterization or paracentesis of the ear drum is the

preferred procedure. Insufflation procedures are usually unsuccessful, because of the difficulties in opening the narrowed Eustachian tube. Three cases of aerotitis media are described. In two cases, aerotitis developed during descent, in a third case during take-off. In all cases there was evidence of conduction deafness in all frequencies. The deafness improved after treatment. Follow-up audiograms taken a year later, however, revealed persistent partial deafness. It was felt that the causal factors in these cases were allergic rhinitis, acute rhinopharyngitis, and a deviation of the septum complicated by acute rhinitis. (From the author's summary)

3373
Riskaer, N.,
and P. Permin
SUSCEPTIBILITY OF THE VESTIBULAR APPARATUS TO ANTIHISTAMINES AND D.F.P. — Acta oto-laryngologica (Stockholm), 44 (1): 89-94. 1954. In English. DNLM

Although a previous work has indicated that antihistaminics active against motion sickness exert a central and supra-nuclear action, no basis was provided for a distinction between more and less active antihistaminics. Knowing that diisopropyl fluorophosphate (D.F.P.) injected in the carotid produces homolateral horizontal nystagmus in rabbits and monkeys, it was decided to examine antihistaminics in regard to their power of preventing nystagmus after an injection of D.F.P. In addition, the effect of D.F.P. on the labyrinth and central nervous system was observed. The following eight antihistaminics were studied: Neptusan (dramamine); amidryl-benadryl (diphenhydramine hydrochloride); authisan (mepyramine meleate); autistin (imidamine hydrochloride); phenergan (proazamine hydrochloride); trihistan (chlorcyclizine hydrochloride); thephorin (phenindamine bitartrate); and lergigan. It was proven that unilateral injection of 0.1 mg./kg. D.F.P. into the carotid of normal rabbits produces homolateral horizontal nystagmus. This response ceases after labyrinthectomy. The eight antihistaminics were tested in regard to their power -- after prophylactic administration -- of preventing release of nystagmus by injection of D.F.P. Only the two closely related, Neptusan (dramamine) and amidryl-benadryl (diphenhydramine hydrochloride), were active in this respect.

3374
Rivolier, J.
[POSSIBILITIES OF PHYSIOLOGICAL EXPERIMENTATION IN THE HIGH MOUNTAINS] Possibilités d'expérimentation physiologique en haute montagne — Concours médical (Paris), 76 (52): 4861-4862. Dec. 25, 1954. In French. DNLM

In order to study the physiological aspects of acclimatization to altitude, 10 subjects lived at approximately 4,000 m. on Mount Blanc for two weeks. Cardiovascular function tests, respiratory function tests (spirometric ventilation studies at rest and during effort, alveolar air measurements) and oximetry were performed throughout the experiment. The climatic, technical, and psychological problems encountered are discussed. The author notes that this type of physiological study away from the laboratory is of no value unless carefully and strictly executed.

3375
Roach, C. G.
EXPANSION SPACE FOR LIQUID OXYGEN CONVERTERS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WCRD Technical Memorandum Report no. 54-45, May 7, 1954. 8 p. (Project no. S-660-139). AD 34 754 UNCLASSIFIED

Tests were conducted on various liquid-oxygen converters to determine whether a reduced vapor space can be utilized for the expansion of liquid oxygen at various temperatures and

pressures. Results indicated that the vapor space on the 300-p.s.i.g. liquid-oxygen converters can be safely reduced to 3% of the total amount of liquid in the container. (AD abstract)

3376
Roadman, H. E.
RELATIONSHIP OF MEASURED INTERESTS TO CAREER DATA FOR AIR FORCE OFFICERS IN THE COMPTROLLER FIELD — (Thesis, Univ. of Minnesota, Minneapolis) 179 p. Ann Arbor: University Microfilms, 1954.
DLC (Microfilm AC-1, no. 8484)

Information about 20 items of personal history was gathered by mail from 243 Air Force officers of two Air Force Specialty groups in the comptroller field. Their vocational interests were assessed by means of the Strong Vocational Interest Blank (SVIB). A comparison of the interest profiles like and unlike the Strong's criterion group of accountants and the personal history factors characteristic of each group gave four significant criterion variables for the like group. The officers with "good" accountant interest profiles were characterized by four highly significant relationships. The high relationship of the SVIB to combinations of these criterion variables validates the use of this interest inventory for choice of personnel in this Air Force occupational field.

3377
Robert, P.
[THE HEARING AND THE AVIATOR] L'audition et l'aviateur. — Médecine aéronautique (Paris), 9 (3): 279-289. 1954. In French.
DLC (TL555.M394, v. 9)

Hearing loss in fliers was studied by a statistical analysis of several hundred audiograms of subjects within a wide range of flying time. Generally the first losses appear in the sound bands between 1000 and 2000 c.p.s., which is of little consequence for conversational speech perception. More rarely the hearing deficiency progresses below 1000 c.p.s. In a certain number of instances, the entire range of hearing is affected.

3378
Robert, P.
[COMBINED EYE AND NOSE DISEASES IN PILOTS] Les synergies oculonasales chez l'aviateur. — Médecine aéronautique (Paris), 9 (4): 489-492. 1954. In French.
DLC (TL555.M394, v. 9)

It is well known that two thirds of the eye diseases have their origin in pathologic processes of the nasal organs. These processes can be either acute, sub-acute, or chronic infections of the nasal passages or the paranasal sinuses or affections of the trigemino-sympathetic nervous system of which retrobulbar neuritis is the most important from the viewpoint of aviation medicine. The author describes eight cases of mild trigemino-sympathetic affections in which eyes became involved. As the visual acuity of the pilot may be affected, the relation of these conditions to flying is evident. The diagnosis and treatment of these oculonasal disorders are not difficult. They are brought to the attention of the flight surgeons because they have often led to an unjustified rejection of pilots.

3379
Robinson, S. 1952
PHYSIOLOGICAL EFFECTS OF HEAT AND COLD. — Ann. Rev. Physiol., 14: 73-96. 1952. DNLM

A review is presented of studies on the physiological effects of heat and cold including the following topics: acclimatization, variations of body temperature, central nervous regulation of temperature, temperature sensation, vascular responses, sweating and evaporation, special metabolic effects, miscellaneous effects of heat, hypothermia, and cold injury. (178 references)

3380
Roby, T. B.
PREREQUISITES FOR PAIR-SCORES

TO BE USED FOR ASSEMBLING SMALL WORK GROUPS. — Air Force Personnel and Training Research Center. Crew Research Lab., Randolph Air Force Base, Tex. Research Bulletin no. AFPTRC-TR-54-13, Apr. 1954. iii+17 p. (Project no. 7713). AD 34 412
PB 126203

It is shown that scores which express predicted compatibility between pairs of persons in small work groups, such as bomber crews, may have general usefulness for rational group assembly. However, if they are to be maximally useful for differential assignment to groups, they must satisfy certain statistical prerequisites: first, there should be a high degree of idiosyncratic choice in the compatibility scores between pairs of classes; second, there should be high mutuality or reciprocity of choice; and, finally, it should be true that persons who have high compatibility scores for each other should have similar compatibility scores for other classes. It is demonstrated that these prerequisites are most likely to be met if persons in each of the separate classes are ordered along dimensions which are relevant to their compatibility in the work situation. (Author's summary)

3381
Roehm, D. C. 1952
R. C. Kory, and G. R. Meneely
STUDIES ON ELECTROCARDIOGRAPHIC MANIFESTATION OF HYPOXEMIA [Abstract]. — Amer Jour. Med., 13 (1): 104. July 1952.
DLC (RC60.A5, v. 13)

The changes in the duration of the Q-T interval during the course of the Levy hypoxemia test have been analyzed with corrections for heart rate (Bazett). The duration of mechanical systole was estimated by measuring from the peak of the R wave in V_4 to the onset of the second heart sound (A_2) in a simultaneous phono-cardiogram. Normal volunteer subjects and a group of patients with coronary artery disease with positive hypoxemia tests were studied. The normal subjects exhibited a mean QTc maximal increase of 0.014 ± 0.010 seconds during the hypoxic period as compared with a mean increase of 0.038 ± .012 seconds in the patients. The changes in R-A_2 closely paralleled the Q-T changes in the normal subjects but not in the patient group. It is suggested that careful Q-T measurements may furnish additional information in evaluation of the hypoxemia test. (Quoted in part)

3382
Roff, M.,
R. B. Payne, and E. W. Moore
A STATISTICAL ANALYSIS OF THE PARAMETERS OF MOTOR LEARNING. — Univ. of Minnesota. Inst. of Child Welfare, Minneapolis; and School of Aviation Medicine, Randolph Field, Tex. Feb. 1954. 22 p. (Project no. 21-0202-0001, Report no. 1) AD 54 883
PB 115090

Correlations among multiple scores obtained from three motor learning situations, and from certain printed tests, were factor analyzed. Learning scores included performance level, rate of change, gain, and variability. Sixteen factors were obtained. Correlations between factors obtained in a given situation differed markedly from those obtained in other situations, although similar factors were found in all three. Correlations between correspondent factors from one situation to another, and between these and printed test factors, indicated a high degree of inter-situation specificity. This led to a general mathematical development of the problem of correlation between gains. (Authors' abstract)

3383
Rohrer, J. H.
FINAL REPORT [VISUAL PERCEPTION, AUDITORY PERCEPTION, AND ORIENTATION] — Tulane Univ. [Urban Life Research Institute], New Orleans, La. (Contract N7onr-43404); issued by Office of Naval Research, Washington, D.C. Aug. 28, 1954. 3 p. AD 39 081
PB 117897

Work is summarized on the analyses of personal history, psychiatric, psychometric, sociometric, and military service performance data which were conducted to aid in the development and evaluation of medicopsychological assessment programs for Marine and Naval officers. Assessment procedures and criterion measures for evaluating these results were also developed. The final work concerns the development of performance criteria on Office of Naval Intelligence billet assignments for evaluating the assessment data. (AD abstract)

3384
Rohrer, J. H.,
S. H. Baron, E. L. Hoffman, and D. V. Swander
THE STABILITY OF AUTOKINETIC JUDGMENTS. — Tulane Univ. Urban Life Research Inst., New Orleans, La. June 1, 1954. 11+1 p. (Contract Nonr-475(01)). AD 32 700 PB118107

Forty-six subjects were trained initially in individual training sessions to make judgments of the extent of the actual movement of a pin-point of light within a circular luminous framework. This session was followed in one hour by a norm-formation session in which subjects were tested in pairs; one member had been trained initially with the stimulus moving at a distance of 2 inches and the other with the stimulus moving at 8 inches. The stability of the judgment norms established in the second session was evaluated one year later by testing the subjects individually. The scores indicated that the norms were stable. Data indicated that the social interaction of the second session resulted in a rapid modification of the response tendencies which had been established in the previous individual-training session. The results were interpreted by employing the concept of "reinforcement". Such framework requires the identification of "motives" or "drives" which, when reduced, strengthen the tendency to respond. (AD abstract, modified)

3385
Rokseth, R.,
and F. V. Lorentzen
COMBINED EFFECT OF ALCOHOL AND HYPOXIA ON FLICKER FUSION FREQUENCY. — Jour. Applied Physiol., 6 (9): 559-565. March 1954.
DLC (QP1.J72, v. 6)

On the assumption that moderate lack of oxygen might increase the effect of alcohol in man, experiments were carried out on 25 healthy subjects, aged 20-25 years, to measure the deviation in flicker fusion frequency during a combination of alcohol and hypoxia. Alcohol, given in doses of 0.5-0.7 g./kg. body weight, when combined with simulated altitude of 10,000 ft. caused in most subjects a greater decrease in flicker fusion frequency than alcohol or hypoxia alone. When the results were related to blood alcohol, a decreased performance was present at concentrations of 0.03-0.04% after 2-4 hours hypoxia. There seems to be a simple addition of effects. Studies on automobile accidents have shown that blood alcohol concentrations of 0.03-0.05% increase accident risk. In the laboratory, it has been found that impairment in the flicker fusion test begins at alcohol concentrations between 0.02 and 0.05%. In regard to hypoxia, airmen now use oxygen above 10,000 ft. Many subjects show a decrease in flicker fusion frequency at this altitude. The flicker fusion test can thus be regarded as a reasonably sensitive indicator with which to measure impairment during alcohol and hypoxia. (Authors' summary, modified)

3386
Romanov, S. N.
[REACTION OF THE BODY CELLS TO SOUNDS OF EXPLOSION] Reaktsiia kletok organizma na zvuki vzryva. — Fiziologicheskiĭ zhurnal S.S.S.R. (Leningrad), 40 (1): 86-89. 1954. In Russian. DLC (QP1.F57, v. 40)

The purpose of the study was to elicit the characteristic state of nerve cells and of the cells of the cornea

of an organism subjected to the effect of powerful sounds of explosion. Tests were made with rabbits, and the explosion sounds were equal to 200 decibels, with the rabbits 6 meters from the source of the sounds. The nerve cells of the spinal ganglia and the cells of the sympathetic nodes were able to survive the state of paranecrosis. The effects of the sounds are compared with the effects of 10 minutes of electric induction stimulation of isolated spinal ganglia with a current of above-threshold intensity. No conclusion is drawn with regard to the channel of sound transmission, whether it was via a specific apparatus, the ear or the perceptivity of a part of the skin surface. It was noted that, as the result of the explosive blast, the paragangliar cells suffered a state of paranecrosis, whereas the corneal cells, which are in direct contact with the external environment, remained unaffected. The question regarding the mechanism of action of powerful sounds on the entire organism is subject for further investigation.

3387
Roscoe, S. N.
DESIGNING THE COCKPIT FOR HIGH-SPEED FLIGHT. — Aeronaut. Engin. Rev., 13 (12): 47-51, 58. Dec. 1954.
DLC (TL501.A326, v. 13)

The technological progress in the design of high-performance aircraft with relatively few changes in the cockpit design has severely restricted the number of pilots who can be trained to operate the new airplanes. The challenge of the aircraft industry for the solution of this pressing problem is to design high-performance aircraft so that it can be operated safely by any normal person after a brief period of training. The resolution of technical problems requires properly oriented experimental research in order to improve the cockpit displays, controls, and automatic equipment handling certain functions of the pilot. As an example of a modern integrated display and control design, the author discusses advances in design as related to the direction of airplane. Principles discussed are: (1) the presentation of related information in a common coordinate system, and (2) the presentation of the airplane by a moving display index positioned against a fixed horizon, corresponding in a one-to-one relationship with the motion of the airplane. The "quickening" of displays and "unburdening" of controls also deserve more attention. There is enough experimental evidence to believe that the transfer of training from an unnatural display and control-display relationship to a natural display is high, thus allowing the utilization of pilots highly trained in the present cockpit controls.

3388
Rosenbaum, D. A.
PRELIMINARY STUDIES OF PRESSURE BREATHING AT ALTITUDE: ANIMAL EXPERIMENTATION. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Note WCRD no. 54-25, Dec. 1954. 3 p. (Project no. 7160). AD 65 531
UNCLASSIFIED

Investigations are reported concerning the physiological and pathological responses to long-term pressure breathing at altitude. Dogs anesthetized with Nembutal (25 mg./kg. body weight) were fitted with a dog suit made of inelastic cotton-nylon fabric. Before ascent, the animal was allowed to prebreathe 100% O_2 for 1 1/2 hr. to denitrogenate. Animals have remained at 50,000 ft. for periods up to 12 hr. One of the most significant findings has been the presence of pulmonary pooling. Sarnoff's findings (NIH, Bethesda, Md.) confirm the results in animal pressure breathing. Research is in progress to further show intrapulmonic pooling in experimental anesthetized animals. The time tolerance at altitude will be increased by allowing the animal to expire maximally several times to reduce the pooled lung blood volume. (AD abstract)

3389
Rosenberg, N.,
and R. [K.] Ambler
PSYCHOLOGICAL CHARACTERISTICS OF NAVAL AVIATION CADETS AS MEASURED BY THE GUILFORD-ZIMMERMAN TEMPERAMENT SURVEY. — In: (Naval School Aviation Med.), Miscellaneous tests and minor evaluations, p. 39-43. Pensacola, Fla. April 20, 1954. (Project Report no. NM 001 058.25.12). AD 50 299(i)
UNCLASSIFIED

The Guilford-Zimmerman Temperament Survey was administered to 14 successive classes of entering Naval Aviation Cadets totaling 628 subjects. A comparison was made of the mean personality trait scores of the entering cadets to mean scores of the norm group on which the test was standardized. The norm group consisted of 523 male college students. The cadets seemed to score higher or nearer the socially approved end of the scale than did the norm group. The most marked differences occurred for the traits of emotional stability and sociability. The cadets are more active, ascendant, objective, friendly, cooperative, and masculine. No significant difference was noted between the groups with respect to restraint and thoughtfulness. (AD abstract)

3390
Rosenberg, N.
TIME TO COMPLETE NAVAL AIR TRAINING AS AN ADDITIONAL CRITERION OF SUCCESS. – Tulane Univ., New Orleans, La. [Contract Nonr-47502]; issued by Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 4, Jan. 4, 1954. 6+5 p. (Project Report no. NM 001 077.01.04). AD 35 226 UNCLASSIFIED

This study investigated training time of successful cadets in order to purify criterion groups for research purposes. It was found that variability in training time is large enough for its adoption as a supplementary criterion measure. Furthermore, the cadet who is extremely slow to complete training is characterized by extremely poor performance, particularly with respect to flight performance itself. It is recommended that successful cadets who require 20 or more months to complete training be eliminated from the pass criterion group. It is apparent from the results reported here that their flight performance is similar to the cadet group who have failed. (Naval School of Aviation Medicine abstract)

3391
Rosenberg, N.,
and W. H. Nelson
TIME TO COMPLETE NAVAL AIR TRAINING: IMPLICATION FOR TRAINING. — Tulane Univ., New Orleans, La. (Contract NR 154-098, ONR Project NR 154-098); and Naval School of Aviation Medicine, Pensacola, Fla. Joint Special Report no. 54-14, June 25, 1954. 11 p. + 4 tables. AD 49 248
UNCLASSIFIED

This report presents results which indicate that cadet time-to-complete Naval Air Training is negatively related to cadet success in the training program. In particular, it was found that cadets who require twenty or more months to be designated as Naval or Marine Aviators: (1) receive a lower over-all score, a lower rating of ground school, leadership, and flight performance, (2) receive lower flight performance ratings during both basic and advanced training, (3) require a greater number of flights to complete both basic and advanced training, (4) receive more unsatisfactory flight ratings during both basic and advanced training, (5) are involved in a greater number of board actions, and (6) are involved in more accidents, and if involved, the accident is more severe (severity defined by cost estimates of damage produced). Average time (17-18 months) cadets appear average with respect to these variables; fast-time cadets (15 months) appear superior. There is a consistent relationship between training time and training performance. It is estimated that 50 slow cadets cost approximately

$600,000 more to train than an equal number of randomly selected average-time cadets. (From the authors' summary)

3392
Rosenberg, N.,
and C. E. Izard
VOCATIONAL INTEREST OF NAVAL CADETS. — Jour. Applied Psychol., 38 (5): 354-357. Oct. 1954.
DLC (BF1.J55, v. 38)

The same as item no. 2026, vol. 2.

3393
Rosomoff, H. L.,
and D. A. Holaday
CEREBRAL BLOOD FLOW AND CEREBRAL OXYGEN CONSUMPTION DURING HYPOTHERMIA. — Amer. Jour. Physiol., 179 (1): 85-88. Oct. 1954. DLC (QP1.A5, v. 179)

Cerebral oxygen consumption varies proportionately with body temperature during hypothermia. Cerebral blood flow varies prportionately with temperature to the same extent as does cerebral oxygen consumption, such that arterio-venous oxygen differences are unchanged. Therefore, hypothermia probably produces no hypoxia of brain tissues so long as adequate respiratory and cardiac functions are maintained. (Authors' summary)

3394
Ross, S.,
T. A. Hussman, and T. G. Andrews
EFFECTS OF FATIGUE AND ANXIETY ON CERTAIN PSYCHOMOTOR AND VISUAL FUNCTIONS. — Jour. Applied Psychol., 38 (2): 119-125. April 1954.
DLC (BF1.J55, v. 38)

It was attempted to determine whether performance on five dependent variables, selected as possible indicators of behavior decrement, changed significantly as a result of fatigue, anxiety, or the interaction of these conditions in a collegiate boxing situation. Twenty-four boxers were measured three times during each of the four conditions: at rest, after heavy exercise, before fighting, and after fighting. The analysis of variance technique was used to test the changes in each variable as a function of the independent variables. The results permit the following conclusions: (1) hand steadiness scores decreased significantly with fatigue but not with the anxiety conditions; (2) body sway scores increased significantly with both fatigue and anxiety; (3) body sway time scores increased with fatigue; (4) tapping showed significant changes in both anxiety and fatigue conditions; and (5) critical flicker frequency thresholds decreased significantly with anxiety. Of these, body sway time scores and tapping were found to be unreliable due to a large amount of uncontrolled variability and, in addition, a possible learning factor in the latter. Measures of steadiness satisfy the criteria for indicators of behavior decrement under fatigue conditions. Body sway scores also may serve as an index of anxiety. Critical flicker frequency thresholds had a high reliability and may be useful in studies of behavior decrement in situations of individual cases. (Authors' summary, modified)

3395
Rossanigo, F.
(INSPIRATORY FLOW AND DURATION DURING MUSCULAR WORK IN ANOXIA) La portata inspiratoria e la durata della inspirazione durante lavoro muscolare compiuto in anossia. — Rivista di medicina aeronautica (Roma), 17 (1): 15-26. 1954. In Italian, with English summary (p. 24).
DLC (TL555.A1R5, v. 17)

Ten healthy young subjects performed muscular work (pedaling a stationary bicycle) at various degrees of anoxia (from normal air to a mixture of 11.6% O_2 in N_2) and at different simulated altitudes (from sea leval to 4,700 m.). The experimental apparatus was so designed as to simultaneously measure the flow of inspired air and graphically record the rate of inspiration. The following results were obtained: (1) Pulmonary ventilation, which normally

increases during muscular work, underwent a further increment in proportion to the degree of anoxia. (2) The volume of inspired air likewise increased with the degree of anoxia; however, only a small proportion was due to anoxia itself (about 12%-17%), the rest to muscular exertion. (3) Muscular work in a normal atmosphere caused an increment in the partial pressure of alveolar CO_2, from 38.30 mm. Hg at rest to 44.57 mm. Hg; during anoxia these values fell to 33.27 or 27.67 mm. Hg, respectively. (4) Muscular work in the normal atmosphere caused an increment of inspiratory flow by 108% over the values during rest; mild anoxia produced a further increase of 33%, while severe anoxia augmented that value to 79%. Finally, (5) the duration of the inspiratory phase decreased progressively during the three conditions applied in the experiment (work; work and mild anoxia; work and severe anoxia). Practical applications of these results with regard to respiratory equipment are briefly discussed.

3396
Rossi, V. 1953
[SPLENOHEPATIC SYSTEM AND SELECTION WITH REGARD TO FITNESS OF FLIGHT PERSONNEL] Sistema spleno-epatico e selezione attitudinale del personale aeronautico. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 491-495. In Italian, with English summary (p. 495).
DNLM (W3.C0943a)

A brief discussion is presented on the use of splenic and hepatic function tests in the medical selection of flight personnel. A proposal is made for the expansion and standardization of this area of exploration to include evaluation of spleno-hepatic functions both under normal conditions and under the effects of flight stimuli.

3397
Roth, F. E.,
and C. W. Lillehei
EFFECT OF GROWTH HORMONE UPON BODY WEIGHT AND INCIDENCE OF BACTERIAL ENDOCARDITIS IN RATS EXPOSED TO HYPOXIA. — Circulation Research, 2 (3): 209-213. May 1954. DLC(RC681.A1A57137, v. 2)

Somatotropic hormone accelerated the rate of gain in body weight in rats, more markedly in females than in males. When administered to rats kept in a decompression chamber at a simulated altitude of 25,000 to 26,000 feet, it effectively neutralized the inhibitory effect of hypoxia on gain in body weight. However, it had no effect on the hypertrophy of the adrenal glands and the heart ventricles induced by hypoxia.

3398
Rotondo, G. 1953
[STUDY ON THE CARDIOVASCULAR FUNCTION OF JET PILOTS. I. OBSERVATION OF SOME CARDIAC FUNCTION TESTS BEFORE AND AFTER ESPECIALLY FATIGUING FLIGHTS] Studio sulla funzione cardiocircolatoria dei piloti de reattori. I. Andamento di alcune prove funzionali cardiache prima e dopo voli particolarmente affaticanti. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 496-503. In Italian, with English summary (p. 509).
DNLM (W3.C0943a)

Cardiac frequency and arterial pressure determinations, the Flack test, and electro- and ballistocardiography were performed in pilots before and after especially fatiguing jet flights. While the arterial pressure, ECG, and ballistocardiograms were not affected by the flights, cardiac frequency was slightly increased from 5 to 8 beats per minute in 40% of the pilots. The Flack test was only slightly influenced. (From the author's summary)

3399
Rotondo, G., 1953
and C. Bramati
[STUDY ON THE CARDIOVASCULAR FUNCTION OF JET PILOTS. NOTE II. MODIFICATIONS OF ARTERIAL

PRESSURE VALUES IN RELATION TO AGE AND TO THE YEARS OF FLIGHT ACTIVITY] Studio sulla funzione cardiocircolatoria dei piloti de reattori. Nota II. Modificazioni dei valori pressori arteriosi in relazione all'età ed agli anni di attivita volativà. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III. Comunicazioni, p. 503-509. In Italian, with English summary (p. 509). DNLM (W3.C0943a)

Little or no change was observed in the arterial pressure of pilots following an especially fatiguing flight. Normal (125 mm. Hg) or higher (140 mm. Hg) values were noted in younger subjects (20-25 years of age), while those over 27-28 years of age with flight activity exceeding 500 hours exhibited subnormal values (115-125 mm. Hg). (From the authors' summary)

3400
Rotta, A., 1952
A. Miranda, and J. Acosta
[HEART MEASUREMENTS IN HIGH ALTITUDES: OBSERVATIONS IN ADULT MEN, CHILDREN, AND ATHLETES] Medidas cardíacas en las grandes alturas. Observaciones en hombres adultos, en niños y en atletas. — Revista Peruana de cardiología (Lima), 1 (2): 95-115. April-June 1952. In Spanish, with English summary (p. 111-112). DNLM

In normal adults and athletes living at an altitude of 4,540 meters (Morococha, Peru) the transverse diameter of the heart was found to be increased from +11% to +45%, with an average increase of +19.2%. It was also noted that the length of residence had little influence on the size of the transverse diameter, and that the natives have a transverse diameter slightly less increased than the residents. A normal transverse cardiac diameter was found in 86.5% of the children, a slightly increased diameter was found in 13.5%. The increase in transverse diameter is mainly due to enlargement of the right ventricular cavities produced by the greater pulmonary resistance, which in turn is caused by chronic high altitude anoxia.

3401
Roughton, F. J. W.
RESPIRATORY FUNCTIONS OF BLOOD. — In: (School of Aviation Med.), Respiratory physiology in aviation, p. 51-102. Randolph Field, Tex. Sept. 1954. (Project no. 21-2301-0003). AD 49 179 PB 121739

Literature on the following principles of respiratory physiology is reviewed in great detail: the partial pressure of dissolved O_2 and CO_2 in blood and the physiological importance of pO_2 and pCO_2; the transport of O_2 by the blood (significance of normal oxyhemoglobin dissociation curve, relation between Fe content, molecular weight, and O_2 capacity, etc.); the speed of O_2 uptake by the blood in the lung; the transport of CO_2 by the blood (rate of O_2 and CO uptake by red-cell suspensions); the diffusing capacity of the lung (calculation of average pO_2 gradient between alveolar air and blood in lung capillaries); nomographic representation of the relation between O_2, and CO_2, and other substances in blood during the respiratory cycle at rest, at sea level, and the effect of short exposure to low O_2 pressure. The nomogram of the blood of Chilean miners residing at 17,600 ft. and working at 19,000 ft. gives the following results: the total hemoglobin and hematocrit values show a 50% increase over sea-level values; while the oxyhemoglobin ratio is only a few percent higher, the total O_2 value carried by the blood is one fifth greater than the O_2 in arterial blood at sea level when breathing air; the pH of the blood is normal; the lowered CO_2 is accompanied by a proportionate fall in the bicarbonate thus compensating the respiratory alkalosis to low pO_2 in the acclimatized man. (74 references).

3402
Roundy, R. W.
HEAT TRANSFER IN GAS FILLED LIQUID OXYGEN CONVERTERS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WCRD Technical Note no. TM-54-11, April 29, 1954. 6 p. (Project no. S-660-139). AD 35 862
UNCLASSIFIED

Studies were conducted to provide information concerning temperature-correction requirements associated with the leak testing of aircraft oxygen systems containing liquid-O_2 converters. Results of analysis indicated that the leak-testing procedures specified for aircraft liquid-O_2 systems are unrealistic because (1) the time allowed for dissipation of the heat of compression associated with charging the system is too short, (2) changes in ambient temperature during the leak-test period have a minor influence on pressures in the liquid-O_2 system, and (3) no consideration is given to the possibility of leak testing a system just subsequent to drainage of liquid O_2. A test procedure is proposed for the elimination of the difficulties. (AD abstract)

3403
Roxburgh, H. L.
SOME PHYSIOLOGICAL REQUIREMENTS OF OXYGEN SYSTEMS. — Proc. Roy. Soc. (London), 143 (910): 17-24. Dec. 1954.
DLC (Q41.L7, v. 143)

The physiological requirements for oxygen masks and regulators used in aviation and in mountaineering are briefly outlined. Since acclimatization to altitude is impractical in flight, the aim in the aircraft oxygen systems is to maintain an alveolar partial pressure of oxygen of 105 mm. Hg, or more, throughout the flight by breathing mixtures of air and oxygen. Closed-circuit systems are not used. A definite altitude limit of 34,000 ft. exists for proper functioning of oxygen systems. Above this height some reduction in alveolar partial pressure must be accepted or pressure supplied in form of a pressure cabin. Above 40,000 ft. the oxygen system becomes secondary to pressurized cabins. Above 50,000 ft. higher pressures are required to oxygenate blood. These pressures must be applied by a head-piece with balancing pressures applied to other parts of the body to insure blood return to the heart. In this way pressures of 2 to 2-1/2 p.s.i. can be tolerated for periods of several minutes depending upon the individual's tolerance. Methods for prevention of accidents arising from faulty use of oxygen systems are discussed. The oxygen mask has to be light, permit downward vision, and be capable of functioning after exposure to about 20 g during ejection in strong winds. In conclusion, the author discusses special requirements for oxygen systems to be used for mountaineering.

3404
Rüedi, L.
DIFFERENT TYPES AND DEGREES OF ACOUSTIC TRAUMA BY EXPERIMENTAL EXPOSURE OF THE HUMAN AND ANIMAL EAR TO PURE TONES AND NOISE. — Annals Otol. Rhinol. and Laryngol., 63 (3): 702-726. Sept. 1954. DLC (RF1.A6, v. 63)

On the basis of experimentally produced histological changes in the animal ear and temporary deafness in the human ear, pure tone trauma and noise trauma are considered to be different forms of acoustic trauma. Also, in the first state of noise trauma as in pure tone trauma the transition of physiological fatigue to pathological fatigue or stimulation deafness occurs abruptly above an individually varying critical intensity for white noise. The noise stimulation deafness is characterized as follows: (1) An occurrence of a wide dip encompassing two octaves between 2000-8000 c.p.s., with the maximum between 4000 and 6000 c.p.s.; (2) a narrowing of the difference limen of a test tone within the dip (4000 c.p.s.); (3) a delayed recovery of the threshold

of tones in the region of the dip; (4) an increase of the difference limen of a second 1000 c.p.s., that is a tone from the frequency range immediately below the noise dip; and (5) a lowering of threshold for the second test tone 1000 c.p.s. The stimulation deafness occurring above the individually varying critical noise intensity varies also individually. (Author's summary)

3405
Ruff, S.
[THE INFLUENCE OF NOISE AND VIBRATIONS ON THE HUMAN ORGANISM] Der Einfluss von Lärm und Erschütterungen auf den menschlichen Organismus. — Zeitschrift für Flugwissenschaften (Braunschweig), 2 (9): 245-251. Sept. 1954. In German.
DLC (TL503.W557, v. 2)

The importance of constitutional factors in the susceptibility to hearing damage from noise is once more emphasized by experiments conducted by Deutsche Versuchsanstalt für Luftfahrt. Regardless of the type of aircraft, number of hours of flight, the flight formation used, temporary hearing loss will be scattered over a wide frequency range in different individuals. Audiograms of former pilots, wireless operators, and radio technicians of World War II leave the impression that in a number of cases hearing had markedly improved after ten years of rest, although the initial "permanent" hearing damage was far in excess of that permitted for flight. Another series of experiments was conducted in response to the complaints of varying degrees of fatigue, particularly in certain flight formations. The effect of aircraft vibration on the sensory organs was investigated with emphasis on vision. A decrease in visual efficiency was noticed as soon as the eye started to resonate in phase with the seat vibrations. It was concluded that the flight personnel must not be subjected to demanding and exacting visual tasks as long as it is impossible to prevent seat vibration at these critical frequencies. The patellar reflex disappeared after a person was subjected to vibrations of 50 c.p.s. with 1.77 mm. amplitude. It returned soon after cessation of vibration. Vibration applied to a small skin area in the groin was similarly effective in extinguishing the patellar reflex. Further research led to the conclusion that reflexes are interrupted by a vegetative effect of vibration in which the vibration of smooth muscle organs results in a regional decrease of the sympathetic tone, primarily manifested in the tendon reflex center.

3406
Rummel, R. W.
AIRPLANE DESIGN IN RELATION TO SAFETY. — Aeronaut. Engin. Rev., 13 (4): 70-75. April 1954.
DLC (TL501.A326, v. 13)

Some suggestions on safety-increasing principles of aircraft design are presented. First, the design of the aircraft should provide the least likelihood for transmitting inaccurate or misleading information to the flight-crew. The performance of emergency operations unnecessarily endangers the aircraft and the crew, while repetition of false warnings causes loss of confidence in the warning system. The second principle of design is to provide simple means whereby the pilot can expeditiously, intelligently, and reliably cope with such emergency situations as may arise. A plan for rapid deactivation of all nonessential electrical systems should be sought to simplify diagnosis of trouble. The third principle is a basic simplicity in the design of the aircraft, backed up by independent and simple emergency actuating systems as opposed to a complicated design with double or triple protective devices multiplying the probability of mechanical failure. Fourth, an investigation of the complex relationship of the human operator to the design problem is needed, particularly in human responses and limitations under both normal and emergency

conditions. Further, the author discusses the use of mock-ups and proto-type design testing, greatest degree of system segregation in designs, and the maintenance of structural conservation. Secondarily to airworthiness, crashworthiness is discussed, emphasizing continued research in emergency evacuation measures.

3407
Ruosteenoja, R.
STUDIES ON CIRCULATORY, RESPIRATORY AND THERMAL ADAPTATION DURING HEAVY EXERCISE. — Acta physiologica scandinavica (Stockholm), 31 (2-3): 248-262. 1954. In English. DNLM

Ventilation, rectal temperature, pulse rate, systolic blood pressure, and peripheral circulation in man were examined during heavy exercise, special notice being taken of the changes at the stage of "dead point" (DP), i.e., before second wind was obtained. It was observed that ventilation volume — both tidal volume and frequency — and the oxygen consumption reached their maximum values at DP, but that the rise in ventilation was relatively greater than the rise in oxygen consumption, and thus the ventilation equivalent for O_2 rose at DP (hyperventilation). Pulse rate and skin blood flow, as measured in the hand, similarly reached their highest values at DP. The rectal temperature rose nearly equally until DP, but remained level during the "second wind" phase. The blood flow in resting muscles, as measured in the forearm, exhibited similar changes. The systolic blood pressure rose clearly at the beginning of exercise, but changed only a little during the first "steady state" and DP. During the "second wind" stage, an obvious decrease occurred. A hypothesis is presented according to which the essential point in the origin of DP is a slight collapse due to the adaptation of the circulatory system to low conditions of heat loss, when the body temperature during work stabilizes at a final level.

3408
Ruthven-Stuart, I. A.
ROYAL NAVAL AIRCRAFT YARD, FLEETLANDS: THE WORK CARRIED OUT AND THE MEDICAL HAZARDS CONCERNED. — Journal of the Royal Naval Medical Service (London), 40 (3): 129-134. Summer 1954. DNLM

Some hazards encountered in work at the Royal Naval Aircraft Yard, Fleetlands, a repair and reconditioning center, are discussed. Internal combustion engine overhaul involving the use of petroleum products and solvents, the use of paint removers and salt baths, electroplating, doping, and radioactive luminizing are processes in which danger to personnel is present. In spite of such hazards, the accident rate is maintained at a very low level through constant precaution.

3409
Sachsenweger, R.
[THE ACUITY OF STEREOSCOPIC VISION IN TWILIGHT] Die Tiefensehschärfe in der Dämmerung. — Albrecht von Graefes Archiv für Ophthalmologie (Berlin), 155 (5): 496-517. 1954. In German. DNLM

The influence of light intensity on stereoscopic acuity was investigated in 62 emmetropic subjects with normal powers of dark adaptation. Graphs of results depicting curves of means and average error are included for illuminations ranging from 100 apostilb (asb) to 0.0001 asb. The considerable statistical dispersion of individual mean values is explained by: (1) formation of dark scotoma associated with difficulties in the central focus, (2) age differences, (3) physiological and psychological variables, (4) general conditions and fatigue symptoms, (5) fluctuations in capacity for dark adaptation depending upon the time of day, (6) local adaptation, and (7) effect of after-images. The following equation was derived from an evaluation of the mean values: $\log T = a. \log L+b$ (T = steroscopic acuity; L = light intensity, a and b = constants). No significant

deviation was obtained for depth perception in the dark from axial myopes up to -8.0 sph. Ametropia affected steroscopic acuity relatively less in twilight than under optimal illumination. Night myopia considerably decreased steroscopic acuity in the dark. Low-grade heterophorias with no significant effect in daytime, reduce stereoscopic vision in the dark.

3410
Saenger-Bredt, I.
[NOTES ON THE 4TH INTERNATIONAL ASTRONAUTICAL CONGRESS] A propos du IV^{e} congrès international astronautique. — Médecine aéronautique (Paris), 9 (1): 85-88. 1954. In French. DLC (TL555.M394, v. 9)

The 4th International Astronautical Congress was held in Zurich, Switzerland, in the first week of August 1953. It was organized by the Fédération Astronautique Internationale (F.A.I.) and attended by scholars and specialists of 17 nations. Astronautics comprises many fields of science among which "Space Medicine" is one of the most important ones and has been given serious consideration already at the preceding Congresses. The main subjects discussed at the 4th Congress are listed.

3411
Saha, H.
OBSERVATIONS ON SOME ENDOCRINE CHANGES UNDER LOW ATMOSPHERIC PRESSURE SIMULATING HIGH ALTITUDE. — Jour. Indian Med. Assoc. (Calcutta), 23 (10): 428-431. July 1954. DNLM

Rats exposed to simulated altitudes of 30,000 ft. two hours a day, for periods up to 12 days, showed a generalized disintegration of the suprarenal cortex, a degeneration of the spermatogenic element and of the interstitial cells of the testes, a marked proliferation of basophilic cells (with a proportional diminution of acidophils) in the pituitary, and body weight losses as high as 13%. Intramuscular administration of vitamin E increased the survival period, retarded the fall in body weight and disintegration of the suprarenal cortex. The vitamin preserved the interstitial cells of the testes but had doubtful protective effects upon the spermatogenic tissue.

3412
Sala, O., and G. Pivotti 1953
[ON THE CHARACTERISTICS OF VESTIBULAR NYSTAGMUS EVOKED BY ACCELERATORY STIMULI OF VERY HIGH PHYSICAL VALUE] Sui caratteri del nistagmo vestibolare evocato da stimoli acceleratori di molto alto valore fisico. — Bolletino della Società italiana di biologia sperimentale (Napoli), 29 (1): 104-106. Jan 1953. In Italian. DNLM

High accelerations (3500°/sec. for 120/1000 of a second) did not induce a nystagmic response in guinea pigs. This response is usually produced by changes in the vestibular centers. However, a vestibular nystagmic response was obtained by successive moderate accelerations.

3413
Salamone, L. 1953
[ON THE REACTIONS TO AMBIENT HYPERTHERMIA. VII. MODIFICATIONS OF SERUM IRON] Sulle reazioni all'ipertermia ambientale. VII. Modificazioni del ferro serico. — Bolletino della Società italiana di biologia sperimentale (Napoli), 29 (8): 1560-1561. July-Aug. 1953. In Italian. DNLM

An increased level of blood iron was determined in subjects exposed to heat (43-45°C.) for two hours. Among the factors responsible for this phenomenon are changes in tissue metabolism, blood volume, erythrocytes and splenic circulation which are caused by hyperthermia.

3414
Sallmann, L., von
PHYSIOLOGIC CHEMISTRY OF THE EYE. — A. M. A. Arch. Ophthalmol., 52 (4): 604-640. Oct. 1954. DLC (RE1.A62, v. 52)

Papers published during 1953 on the physiologic chemistry of the eye are reviewed, including studies on the effects of anoxia on the eye (p. 627). An extensive bibliography of 162 references is included.

3415
San Martín, M.,
Y. Prato, and L. Fernández
[EXCRETION OF SOME URINARY STEROIDS IN THE NATIVE FROM THE COAST AND THE NATIVE AT ALTITUDE AND THE CHANGES EXPERIENCED IN THE COASTAL NATIVE DURING HIS ADAPTATION TO ALTITUDE] Excreción de algunos esteroides urinarios en el nativo de la costa y en el de altura y cambios que experimentan los costeños en su adaptación a la altura. — Anales de la Facultad de medicina (Lima), 37 (4): 736-746. 1954. In Spanish. DNLM

The coastal dweller and the native living at an altitude of 4,560 meters do not differ in their urinary excretion of neutral 17-ketosteroids and in reduced corticoids. The coastal dweller demonstrates changes in the excretion of urinary steroids within the first twelve months of his adaptation to altitude. (Authors' summary)

3416
Sargent, F.,
V. W. Sargent, R. E. Johnson, and S. G. Stolpe
THE PHYSIOLOGICAL BASIS FOR VARIOUS CONSTITUENTS IN SURVIVAL RATIONS. I. THE EFFICIENCY OF YOUNG MEN UNDER TEMPERATE CONDITIONS. — Univ. of Illinois, Urbana (Contract AF 18(600)-80); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-484, Part 1, June 1954. xviii + 526 p. (RDO no. 696-81). AD 47 643 PB 128056

In order to arrive at conclusive judgments on the problem of all-purpose, all-environment survival rations, comprehensive studies, combining physiological, biochemical, nutritional, and clinical approaches, must be conducted in the field and in hospitals with emphasis on the effects of physical work, weather, and injury on the body efficiency and organ function of the survivor. According to the results of the present study, the all-purpose survival ration should be planned to provide: (1) A caloric intake of about 2000 calories a day, and more if possible (the potentially deleterious effects of the regimens studied decreased in the order: starvation, 1000 calories, 2000 calories, and 3000 calories). (2) A distribution of calories approximating 15% protein, 52% carbohydrate, and 33% fat (the greater the deviation from this distribution, the more deleterious the nutrient combination tended to become). The castaway should be provided with water in amounts as liberal as feasible (limitations of water to 900 ml./day was always deleterious regardless of the nutrient mixture). On the basis of previous military and civilian work, the castaway should be provided with adequate amounts of all known vitamins (in the present study luxus amounts of vitamins were provided in all experimental mixtures and at all times). If they are to be incorporated in survival rations, certain present components should be improved technologically in order to obviate certain undesirable clinical symptoms and signs which they produced (especially when water was limited, the chocolate bar, meat bar, and cereal biscuit, in that order, frequently evoked gastrointestinal symptoms. The candy components often evoked symptoms in the mouth). (Authors' summary of conclusions).

3417
Sargent, F.
ROLE OF THE FIELD TEST IN NUTRITION AND WEATHER STRESS STUDIES. — In: Spector, H. and M. S. Peterson, (ed.), Nutrition under climatic stress. . . , p. 130-156; discussion, p. 165-167. Nat. Acad. of Sci. - Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D.C. May 1954. AD 67 453 PB 117996

A survey of data on ketonuria observed during ration trials and nutritional surveys between 1944 and 1950 suggests the following generalizations: With one exception, the data on percent ketonuria followed a curve characterized by (1) low levels during the control phase, (2) an ascent to a maximum a few days after beginning the field phase, and (3) a decline toward control levels before termination of the field phase. The metabolic reaction is presumably independent of the amount of available liver glycogen, since the curve is not influenced by variations in the amount of muscular exercise, nutritional mixture, and calorie content. As the average caloric balance becomes increasingly negative, the maximum ketonuria tends to come earlier. An adaptation to field test stresses is shown by less ketonuria developed on exposure of the same subjects to a second successive field trial. The present data preclude a distinction between cold stress or the muscular exercise as the agent responsible for activation of the adaptive mechanism. A hypothesis is offered that ketonuria is a metabolic expression of the altered activity of the pituitary-adrenal axis in response to stress. Practical suggestions are made for future field tests.

3418
Sartorelli, E., and G. Ricci 1952

[A SIMPLE FORMULA FOR THE DETERMINATION OF RESPIRATORY DEAD SPACE IN MAN: EXPERIMENTAL CONTROL] Una formula semplice per la valutazione dello spazio morto respiratorio nell'uomo: controllo sperimentale. — Medicina del lavoro (Milano), 43 (12): 468-477. Dec. 1952. In Italian, with English summary (p. 476). DNLM

A discussion is presented on the Bohr formula for measuring the volume of respiratory dead space under controlled conditions. This formula may be considered valid when the volume does not exceed 500 cc. In addition, its usefulness in evaluating pulmonary function is noted. (28 references) (Authors' summary, modified)

3419
Sataloff, J. 1953

OCCUPATIONAL DEAFNESS. — Medicina del deporte y del trabajo (Buenos Aires), 18 (128): 598-600. Sept. 1953. In English. DNLM

Deafness resulting from exposure to various types of occupational noise, including that found in the aviation industry, is discussed. Occupational deafness is characterized by hearing loss for high frequencies and difficulties in discriminating speech. Comprehensive hearing programs are discussed consisting of acoustical evaluations of noise for intensity and frequency characteristics, pre-employment hearing studies, and periodic audiograms on all personnel exposed to hazardous sound.

3420
Sataloff, J.

AUDITORY FATIGUE IN INDUSTRIAL HEARING TESTING. — Indus. Med. and Surg., 23 (4): 153-155. April 1954. DLC (RC963.A37, v. 23)

In connection with conservation-of-hearing programs in noisy industries, 32 subjects were selected from 145 employees of a large jet engine testing plant. In their daily work the subjects were exposed to continuous jet engine noise, the overall noise level being 106 to 108 db. None of the men used ear protectors in routine work. Pre-work audiograms revealed that of the 64 ears tested only 16 showed normal hearing acuity defined as less than 15-db. loss in any frequency. Almost all significant losses were at 4,000 and 8,000 c.p.s. Post-exposure audiograms were taken within 15 min. after the men left the working area having been exposed for three hours to jet engine noise. None of the subjects demonstrated any significant auditory fatigue in any frequency fifteen minutes after exposure. Two of the subjects retained as much as a 25-db. loss at 8000 c.p.s. until ten minutes after exposure, but pre-exposure levels

were attained within five more minutes. It is concluded that for this industry the factor of temporary hearing loss can be disregarded if audiograms are taken 15 minutes after daily exposure. The relationship between temporary and permanent hearing loss has to be investigated further, before it can be said with certainty that ears which sustain prolonged or exaggerated auditory fatigue are more susceptible to permanent deafness.

3421
Saunders, D. R.
RELATIONSHIPS AMONG SOME CONCEPTS AND CRITERIA OF MILITARY LEADERSHIP [Abstract]. — Amer. Psychologist, 9 (8): 465. Aug. 1954. DLC (BF1.A55, v. 9)

Each concept of criterion of leadership is expressed in terms of rank ordering of traits in importance for leadership. Previous analysis of the concepts of leadership held by applicants for admission to the "Academy" showed the existence of the following six primary factor concepts: (1) Well-drilled Leader, (2) Self-sufficient Leader, (3) Social Leader, (4) Good-follower Leader, (5) Leader of Leaders, and (6) Universal Leader. For this study, concepts were obtained from three other sources, correlated with primary concepts and with each other. Most concepts obtained from other studies gave a correlation with primary concepts (1), (2), and (4). The concept described by the validities of the traits for predicting leadership ratings after one year (obtained from item analysis of a forced-choice trait comparison test given 294 applicants at the academy) was found to be substantially related to factor (4) (.47). These results illustrate the utility of the previous factor study of concepts, and point a way for development of leadership predictors. (Abstract, modified)

3422
Scaccianoce, M. 1952
[KINETIC BEHAVIOR OF A LUMINOUS POINT FOLLOWING ELECTRICAL STIMULATION OF THE LABYRINTH AND ITS IMPORTANCE IN AVIATION MEDICINE] Comportamento cenetico del punto luminoso in sequito a stimolazione elettrica del labirinto e sua importanza in medicina aeronautica. — Il lavoro neuropsichiatrico (Roma), 11 (3): 507-509 Dec. 1952. In Italian. DNLM

The autokinetic phenomenon (illusion of movement of a small light in a dark field) is discussed and the effects of labyrinthine electrostimulation briefly noted. With reference to flight, it is suggested that the autokinetic illusion may be the factor responsible for flight accidents, especially during landing, rather than the factors of anoxia or acceleration affecting the sense organs.

3423
Scano, A.
[MODERN RESUSCITATION METHODS] Metodi moderni di rianimazione. — Rivista di medicina aeronautica (Roma), 17 (2-3): 207-223. April-Sept. 1954. In Italian, with English summary (p. 221). DLC (TL555.A1R5, v. 17)

A review is presented of the chief conditions that may acutely provoke a state of apparent death and require resuscitation methods, particularly the various types of acute anoxia and asphyxia. The following methods of artificial respiration are mentioned: (1) The manual method (desirable because it can be applied immediately and can be done by any competent individual), including pressure exercised on the thorax, thoracic pressure plus movement of the arms, thoracic pressure plus alternation of body position, and rhythmic blowing of air into the patient's mouth. (2) The mechanical method (recommended in cases where the patient has not been breathing for a great length of time), including use of a pulsator for exhaling, use of a pulmotor or pneumatic balance resuscitator for inhaling, and use of an iron lung or biomotor for both. (3) Electrical stimulation of the phrenic nerves and respiratory muscles. (4) Administration

of air enriched with pure oxygen (in small doses only) or with carbon monoxide (which can, however, worsen the the state of hypercapnia). (5) Drugs to stimulate respiration spontaneously, such as lobeline, diethylamide carbopyridine, camphor and water-soluble derivatives, caffeine, picro toxins, or strychnine. (6) Direct massaging of the heart. Or (7) intravenous injection of whole blood into the carotid artery (easier and less dangerous) under favorable conditions, even when circulation has ceased for several minutes.

3424
Schaefer, H. J.
THE CROSS SECTION FOR THIN-DOWN HITS FROM HEAVY NUCLEI OF THE PRIMARY COSMIC RADIATION IN BIOLOGICAL EXPERIMENTATION. — Naval School of Aviation Medicine, Pensacola, Fla. Jan. 12, 1954. 1+17+6 p (Project Report no. NM 001 059.13.07). AD 37 053
UNCLASSIFIED

A complete mathematical analysis is presented of the target geometry for different target objects in studies of biological effects of cosmic rays. Formulas were derived for computing the hit frequencies of different targets at all altitudes. Since the ranges of the incident particles must be known for these calculations, the commonly used spectra were converted accordingly for all components of the heavy primaries for all altitudes. (AD abstract)

3425
Schaefer, H. J.
DEFINITION OF A PERMISSIBLE DOSE FOR PRIMARY COSMIC RADIATION. — Jour. Aviation Med., 25 (4): 392-398, 411. Aug. 1954.
DLC (TL555.A1A4, v. 25)

Recently proposed amendments to the Recommendations of the International Commission on Radiological Protection contain detailed data on the relative biological effectiveness (RBE) of particle radiations. Extrapolation of these data to cosmic radiation can be carried out only for the high- and medium-energy part of the heavy nuclei spectrum; it cannot be extended to the low-energy part where extremely high values of the rate of energy loss occur in the terminal sections of heavy nuclei tracks. This ionization-peak phenomenon is limited to northern regions above about 45 degrees latitude It is this very region in which a maximum total exposure of 90 mrem/24 hours is obtained without the contribution of the ionization peaks. It thus seems appropriate to divide the region of extreme altitude in which the primary cosmic radiation predominantly contributes to the total ionization in two zones, one above and one below 45 degrees latitude. Whereas for the equatorial zone the common concepts in the assessment of the radiation hazard can be extrapolated with reasonable confidence, no definition of a permissible exposure for the northern region can be derived at the present time. (Author's summary, modified)

3426
Schaefer, H. J.
GRAPHS AND TABLES FOR THE HIT FREQUENCIES FROM HEAVY NUCLEI OF THE PRIMARY COSMIC RADIATION. II. HIT FREQUENCIES FOR SPHERICAL TARGETS OF 2 TO 5 CENTIMETER DIAMETER (SMALL MAMMALS). — Naval School of Aviation Medicine, Pensacola, Fla. Aug. 4, 1954. 6+4 p. (Project Report no. NM 001 059.13.09). AD 44 401 UNCLASSIFIED

Graphs are presented which permit a direct reading of cosmic-ray hits per hour in spherical targets of 2- to 5-cm. diameter for all altitudes and latitudes of exposure. A distinction is made in the presentation of the data between heavy-nuclei hits of an excessively high rate of energy loss and ordinary hits. General conclusions with regard to optimum conditions of the different parameters of exposure are identical with those from the hit-frequency curves for small objects in the millimeter range. (AD abstract)

3427
Schaefer, H. J.
THEORY OF PROTECTION OF MAN IN THE REGION OF THE PRIMARY COSMIC RADIATION. — Jour. Aviation Med., 25 (4): 338-350. Aug 1954.
DLC (TL555.A1A4, v. 25)

This is a theoretical discussion of protection against the potential hazard to humans from primary cosmic radiations during flight at very high altitude. The heavy nuclei of primary radiations have the property of intense ionization; this increases as the primary particle reaches the terminus of its passage through matter. This type of activity, called a thin-down hit, occurs only at northern latitudes of 50° or more where there is little protection from the earth's electromagnetic field. Protective shielding for the human body which is too thin could actually intensify this ionization hazard, while the weight of a sufficiently thick shield makes it impractical to use in flight. Heavy nuclei of ordinary ionization potential can be absorbed by materials which have small atomic weights; therefore, those shielding substances which have a high hydrogen content make the best absorbers. Such materials are paraffin and plastics; aluminum is also included in the discussion for the reason that it is a basic component of aircraft structure. Once again, however, the weight of these materials is prohibitively high. Thus, it would seem that the only protection available at present against heavy nuclei hits is limitation of exposure times.

3428
Schaefer, K. E.
and C. T. G. King
CARBOHYDRATE METABOLISM AND ADRENOCORTICAL ACTIVITY UNDER 30 PER CENT CO_2 IN AIR AND OXYGEN [Abstract]. — Jour. Clin. Endocrinol. and Metabolism, 14 (7): 824. July 1954. DLC(RC648.E45, v. 14)

Guinea pigs were exposed to 30% CO_2 in air or in oxygen over periods of 10 and 60 minutes. Under both experimental conditions the same degree of acidity of the blood was produced at the end of one hour (pH = 6.86 and 6.87); in addition, anoxia developed under CO_2 in air. Under CO_2 in air, the adrenal cholesterol content decreased; leukocytes and absolute number of eosinophils and lymphocytes did not change. Under CO_2 in O_2 adrenal cholesterol, eosinphils, and lymphocytes did not change. CO_2 both in air and in oxygen decreased liver glycogen (-52 and -62%, respectively) and increased blood sugar (+96% and +95%). With CO_2 in air, muscle glycogen increased 32% and lactic acid decreased 50%; under CO_2 in oxygen, the opposite changes were found (muscle glycogen -35%, and lactic acid +42%).

3429
Schaefer, K. E.,
C. T. C. King, J. L. Mego, and E. E. Williams
EFFECTS OF PROLONGED EXPOSURE TO 1.5% CARBON DIOXIDE IN AIR FOR PERIODS UP TO 91 DAYS ON BODY WEIGHT, CARBOHYDRATE METABOLISM, AND ADRENAL CORTICAL ACTIVITY IN GUINEA PIGS. — Naval Medical Research Lab., New London, Conn. Report no. 256 (vol. 13, no. 17), Oct. 12, 1954. iii+21 p. (Project Report no. NM 002 015.11.05). AD 48 781 UNCLASSIFIED

In two experiments, normal male guinea pigs of the Connaught strain were exposed to 1.5% CO_2 over periods of 42 days and 91 days. The CO_2 tension in the blood rose significantly and the pH dropped slightly during exposure to CO_2. Body weight showed a biphasic change, an initial decrease lasting for a period of 13 days followed by an increase. After a latent time of seven days, adrenal cortical activity was found increased during exposure to 1.5 percent CO_2, as indicated in the decrease in adrenal cholesterol content and marked eosinopenia and lymphopenia. Blood sugar did not change, while liver glycogen and muscle glycogen decreased significantly during exposure to CO_2. Erythrocytes, hemoglobin, and hematocrit increased during

CO_2 exposure after a latent time of seven days. The observed rise in the reticulocyte counts indicated a slight erythropoietic stimulation. (Authors' abstract)

3430
Schaefer, K. E.
GROUP DIFFERENCES IN CARBON DIOXIDE RESPONSE OF HUMAN SUBJECTS. — Federation Proceedings, 13 (1^I): 128. 1954. DLC (QH301.F37, v. 13)

Carbon dioxide response studied in 70 subjects using concentrations of 1.5%, 3.3%, 5.4% and 7.5% CO_2, allowed differentiation of a low and a high ventilation group on the basis of a quantitative difference in ventilatory response to 5.4% and 7.5% CO_2. Subjects of these 2 groups also differed in their normal respiratory pattern on air. The low ventilation group showed a large tidal volume, small respiratory rate, higher alveolar CO_2; the high ventilation group exhibited a small tidal volume, higher respiratory rate and lower alveolar CO_2. Further group differences were as follows: the low ventilation group showed during exposure to 7% CO_2 (1) a lower pulse rate increase, (2) a lower blood sugar increase, and (3) a lesser eosinopenia. (From the author's summary)

3431
Schaefer, K. E.,
and C. R. Carey
INFLUENCE OF EXPOSURE TO VARIOUS CARBON DIOXIDE CONCENTRATIONS ON FLICKER FUSION FREQUENCY AND ALPHA BLOCKING. — Naval Medical Research Lab., New London, Conn. Report no. 251 (vol. 13, no. 12), Aug. 27, 1954. iii+12p. (Project Report no. NM 002 015.11.04). AD 46 698 UNCLASSIFIED

Flicker fusion frequency was measured with a Krasno-Ivy flicker fusion meter in 24 subjects during exposure to 1.5%, 3.3%, 5.4%, and 7.5% CO_2. The latent time of alpha blocking [in the electroencephalogram] was determined under the same conditions of CO_2 inhalation in 22 subjects. Inhalation of 3%, 5%, and 7% CO_2 produced a significant decrease in flicker fusion frequency and increase in latent time of alpha blocking. Hyperventilation tests were performed in which the respiratory minute volume was increased to the level usually found under 5% CO_2 but a normal level of alveolar CO_2 was maintained by adding a small concentration of CO_2 into the inspired air. Under these conditions the latent time of alpha blocking was not changed. (Authors' summary)

3432
Scheinberg, P.,
L. I. Blackburn, M. Rich, and M. Saslaw
EFFECTS OF VIGOROUS PHYSICAL EXERCISE ON CEREBRAL CIRCULATION AND METABOLISM. — Amer. Jour. Med., 16 (4): 549-554. April 1954. DLC (RC60.A5, v. 16)

The effects of vigorous muscular exercise in the upright posture were studied in thirteen normal subjects and compared with the changes resulting from motionless standing. Exercise resulted in a decrease in cerebral vascular resistance and an increase in cerebral oxygen consumption. The decrease in mean cerebral blood flow, which results from motionless standing, did not occur with exercise. There was no change in cerebral respiratory quotient. Although exercise resulted in a striking fall in blood carbon dioxide content and pH, no correlations could be made between these changes and the alterations in cerebral circulatory or metabolic functions. There was a close correlation between changes in cerebral vascular resistance and cerebral oxygen consumption, though the reason for this is not known. (From the authors' summary)

3433
Schierbeek, P.
VESTIBULAR REACTIONS IN PIGEONS AFTER SMALL, WELL-DEFINED ROTATORY STIMULI, BEFORE AND AFTER OPERATION ON THE

LABYRINTH. — Practica Oto-Rhino-Laryngologica (Basel), 15 (2): 87-98. 1953. In English. DNLM

Unilateral sections of the horizontal semicircular canal, unilateral labyrinthectomy, and fenestration of the ampulla of one horizontal canal, were performed on pigeons. Rotatory stimuli tests conducted after the operations showed in all groups a marked decrease in degree of compensatory reaction, and an increase in delay before response. Partial recovery occurred within weeks, but only in the case of fenestration was a complete recovery generally noted.

3434
Schierbeek, P. 1953
VESTIBULAR TURNING TESTS BY MEANS OF WEAK STIMULI. — Practica oto-rhino-laryngologica (Basel), 15 (2): 73-87. 1953. In English. DNLM

Cupulometric vestibular tests were performed on 55 normal persons and on 150 patients with vertigo by means of a simple, light-weight rotating cage, accelerated subliminally by manual force. The cupulometric technique and the apparatus employed are described in detail. The perception of after-rotation sensation is often difficult, and tests for the duration of nystagmus are recommended as yielding better evidence of vestibular stimulation. In this respect, the cupulometric method appears to give improved results as compared to results of other tests such as the well-known Barany test.

3435
Schiller, A. A. 1952
CLINICAL PHYSIOLOGY OF THE CAPILLARY CIRCULATION. — Med. Clin. North America, 1952. (Jan.): 201-215. DLC (RC60.M4, Jan. 1952)

Studies on capillary circulation are reviewed under the following headings: (1) hemodynamics, (2) capillary permeability and agents influencing it, and (3) capillary topography, vasomotion, and effects of alterations in vasomotion. It is pointed out that although complete anoxemia increase capillary permeability, the experimental evidence is insufficient to deduce that moderate or chronic hypoxemia has the same effect on capillary walls. Moderate hypoxemia produces hemodynamic changes which compensate for the reduced blood oxygen content in normal individuals.

3436
Schilling, J. A.,
and R. B. Harvey
EFFECT OF SIMULATED ALTITUDE AND EXPLOSIVE DECOMPRESSION ON DOGS WITH BILATERAL PARTIAL PULMONARY RESECTION. — Federation Proceedings, 13 (1^{I}): 129. 1954. DLC (QH301.F37, v. 13)

The purpose of these experiments was to determine the tolerance of unanesthetized dogs to acute exposure to varying simulated altitudes and to explosive decompression following resection of two or more lobes of each lung. Healthy mongrel dogs were selected. Hematocrits were checked initially and throughout the experiments and normal cardiac function was assumed. The altitude tolerance of the normal animals was tested by ascent to 33,000 feet in an altitude chamber, using the EEG and the ability of the dog to stand as criteria of hypoxia. Exercise on a treadmill with measure of oxygen consumption and calculation of maximal pulmonary diffusion was carried out. Arterial oxygen tension after exercise was checked. Following initial training on the treadmill and control studies, the middle and lower lobes of the right lung were resected and a suitable recovery period allowed. The studies were repeated and the upper lobe and the lingular segment of the left lung was resected. The above studies were again repeated, and the animal was sacrificed after measurement of functional residual volume by rapid decompression. Initial results indicate

that the dogs tolerated acute exposure to altitude remarkably well following resection of 2-4 of the 7 major lobes of both lungs. Other findings will be discussed. (Authors' summary modified)

3437
Schlütz, G. O.

[THE PROBLEM OF VACUOLATION IN THE CENTRAL HEPATIC LOBULES AND A NEW PROCEDURE FOR LIVER PERFUSION: AN EXPERIMENTAL ANIMAL STUDY OF CONCERN TO AVIATION PATHOLOGY ON THE PROBLEM OF ACUTE DEATH FROM EXPOSURE TO HIGH ALTITUDES] Zum Problem der Vakuolenbildung in den zentralen Leberläppchen, zugleich ein neues Verfahren der Leberdurchströmung. Eine tierexperimentelle luftfahrtpathologische Studie zum Problem des akuten Höhentodes. — Ärztliche Forschung (München), 8 (2): 78-84. Feb. 10, 1954. In German, with English summary (p. 78). DNLM

The process of vacuolic degeneration of the central liver cells observed after death from exposure to high altitude was experimentally investigated in animals. Perfusions of livers of several animal species, in situ and extirpated, were undertaken and different gases added to the solution. The significance of colloid bodies was studied. The results revealed that the animal organism may produce identical responses to a multitude of influences. On the basis of frequent observations of vacuolic degeneration by enzymic block, and because of the ease such block appears after addition of CO_2 to the solution perfused through the liver, it was concluded that heightened CO_2 stasis resulting from a metabolic disturbance is responsible for the vacuolic degeneration observed in high altitude deaths.

3438
Schmidt, Ingeborg

NEW TESTS FOR THE EXAMINATION AND TRAINING OF COLOR VISION: EVALUATION OF THE COLOR VISION MULTITESTER (SIGNAL LAMP) FOR AVIATION. — School of Aviation Medicine, Randolph Field, Tex. June 1954. 10 p. (Project no. 21-29-006, Report no. 4). AD 54 889 PB 116585

An evaluation is made of the Color Vision Multitester, a device which is recommended for the testing of color vision. The method separates subjects with normal color vision or color vision defects of a low degree from individuals with more serious defects of color vision.

3439
Schmidt, Vagn

[HIBERNATION] Hibernation. — Militaerlaegen (København), 60 (4): 114-119. Dec. 1954. In Danish.
DLC (RC970.D3, v. 60)

This is mainly a review of French and English studies dealing with the physiology of hibernation and methods of inducing hypothermia by drugs. A few suggestions are made in regard to application of artificial hibernation under extreme stress or shock or combat conditions.

3440
Scholz, H. 1953

[THE EFFECTS OF GLARE ON VISUAL CAPACITY IN TWILIGHT] Über den Einfluss der Blendung auf die Dämmersehleistung. — Arbeitsphysiologie (Berlin), 15 (1): 1-22. 1953. In German.
DNLM

A compensatory position control tracking device was used to register tracking efficiency after exposure to intensive momentary glare and under the conditions of periodically increased peripheral glare. Results indicate that: (1) After intense momentary glare, readaptation to dark in some subjects is effected quickly, but in others it proceeds in a wave-like manner for a considerably longer period of time. (2) A constant decrease in efficiency, dependent on individual variations, was noted during continuous peripheral glare. This process was thought to be the result of impulse summation caused by

stimuli of stray light on the retina; in this case it is important to differentiate between the formation of reflection and diffusion halos. The author states that the decrease in visual capacity under such glare conditions is specifically affected by the emotional ability to suppress annoying visual stimuli and by a tendency to relax after a period of heightened attention. (3) Intermittent light of medium intensity does not affect dark adaptation significantly; in fact, increases in work efficiency observed during dark phases may result from psychological contrast effects. (4) The degree of individual susceptibility to blinding after intense momentary glare is not necessarily the same under continuous peripheral glare. The author suggests that individuals particularly susceptible to blinding from glare should be rejected from engaging in industrial and traffic occupations where such conditions prevail.

3441
(School Aviation Med.)
EVALUATION OF METHODS FOR DETERMINING BLOOD VOLUME. — Columbia Univ. Coll. of Physicians and Surgeons, New York. (Contract AF 33(038)25899); issued by School of Aviation Medicine, Randolph Field, Tex. April 1954. 85 p. (Project no. 21-2301-0005, Reports no. 4 to 14). AD 34 898 (A through K) UNCLASSIFIED

This is a series of eleven reports by thirteen authors, dealing with the various methods devised for determining blood volume. The differences in estimates of blood volume derived from the plasma-volume hematocrit procedure and from the cell-volume hematocrit procedure were investigated in dogs by simultaneous measurements of plasma volume (by means of T-1824) and cell volume (in the P32). True estimates of blood volume may be obtained with either procedure provided the

$$\text{ratio} \frac{\text{over-all cell percentage}}{\text{venous cell percentage}} \text{ is known.}$$

Direct comparisons showed that the P^{32} and Fe^{55} methods measure the same cell volume whereas the carbon monoxide method gives values 12% higher. Additional assurance that T-1825 measures plasma volume is provided by evidence that its volume distribution is identical with that of I^{131} albumin and of autogenous hemoglobin. (School of Aviation Medicine abstract)

3442
(School Aviation Med.)
RESPIRATORY PHYSIOLOGY IN AVIATION. — Edited by W. M. Boothby. School of Aviation Medicine, Randolph Field, Tex. Sept. 1954. ix+189 p. (Project no. 21-2301-0003). AD 49 179
PB 121739

This is a collection of scientific treatises summing up the present knowledge on the association of aviation and respiratory physiology. Subjects covered by the individual papers range from the various physiological limitations imposed by altitude, to the development and use of protective equipment and devices in high-altitude flight.

The following papers have been abstracted separately as items no.: 2515, 2567, 2588, 2681, 2727, 3090, 3127, 3348, 3370, 3401, and 3633.

3443
Schroeder, W., and H. Losse 1953
[ON THE ORIGIN OF RESPIRATORY FLUCTUATIONS OF BLOOD PRESSURE] Zur Entstehung der respiratorischen Blutdruckschwankungen. — Pflügers Archiv für die gesamte Physiologie (Berlin), 258 (1): 1-7. Nov. 1953. In German.
DLC (QP1.A63, v. 258)

It was shown by continuous analyses of circulation in normal freely breathing men and dogs, that the respiratory blood pressure fluctuations are controlled not only by respiratory mechanics, but also through vasomotor influences. The respiratory fluctuations in blood pressure are weakened or disappear under anesthesia and during atropine experiments without changes in

the respiratory rate or volume. It is concluded that the respiratory blood pressure fluctuations are primarily originated through nervous processes, and respiratory mechanics play only a secondary role.

3444
Schroeder, W.,
W. Schoop, and E. Stein
[BLOOD CIRCULATION IN THE EXTREMITIES DURING ACUTE OXYGEN WANT WITH PARTICULAR REGARD TO THE FUNCTION OF THE ARTERIO-VENOUS ANASTOMOSES] Die Durchblutung der Extremität im akuten Sauerstoffmangel unter besonderer Berücksichtigung der Funktion der arterio-venösen Anastomosen. — Pflügers Archiv für die gesamte Physiologie (Berlin), 259 (2): 124-141. 1954. In German. DLC (QP1.A63, v. 259)

Continuous measurements of capillary and venous pressures were carried out in the frontal extremities of an unanesthetized dog inhaling anoxic mixtures in order to observe changes of circulation in the capillaries and in the arterio-venous anastomoses. Depending upon the degree of oxygen deprivation, the response of these vessels in the extremities may be divided into three stages: In the first stage (8-9% O_2) the capillaries are dilated without any functional changes in the arterio-venous anastomoses. In the second stage (6-8% O_2), simultaneously with capillary dilation, the anastomoses become constricted. In the third stage (5-6% O_2), in addition to the circulation in the anastomoses, that of the capillaries, and thereby the circulation of the entire extremity, is cut off. In the first two stages, the decrease of oxygen tension is compensated by the increase of capillary area and of blood flow velocity. The stronger and faster capillary circulation is enhanced or made possible in the second stage by the constriction or the occlusion of the arterio-venous anastomoses. (Authors' summary, translated)

3445
Schubert, G. 1953
[VESTIBULAR THRESHOLDS FOR CORIOLIS ACCELERATIONS] Vestibuläre Reizschwellen für Coriolis-Beschleunigungen. — Naturwissenschaften (Berlin), 40 (18): 492. Sept. 1953. In German. DLC (Q3.N7, v. 40)

The maximum relative velocity and the duration of coriolis force exceeding the vestibular threshold in head movements were established experimentally as 0.95 m./sec. and 0.25-0.28 sec., respectively. The threshold values of angular velocity giving rise to symptoms of falling were determined in 33 subjects by means of a rotating chair at different velocities. From these the effective coriolis acceleration was calculated with the assumption of the maximum relative velocity of 0.95 m./sec. The results are presented in a frequency distribution curve of the percentage of individuals subject to vestibular reaction at coriolis accelerations in the range of 0.4-1.6 m./sec^2. Application of these findings to the proposal of creation of an artificial field of gravity in a space station, by rotating it with a threshold value of $\omega = 0.51$ sec.$^{-1}$ (gravitation 1g). or 0.285 sec.$^{-1}$ (g/3) at a radius of 37.5 m., shows the coriolis acceleration to be 0.92 m./sec.^{2} and 0.51 m./sec.^{2}, respectively. In the former event 40% of individuals experience vestibular reactions, while the second value may be regarded as just below threshold. In general, the experiments showed that vertigo decreases in chronic above threshold stimulation, but symptoms of nausea increase reaching in some cases neurotic proportions. If the subject's eyes are open permitting visual correction of the vestibular sensations vertigo is lessened, but again nausea is increased. Both nausea and vertigo increase if the subject is stimulated with opened eyes in a rotating environment, thus excluding the visual perception of motion.

3446
Schubert, G.
CORIOLIS-NYSTAGMUS. — Jour.

Aviation Med., 25 (3): 257-259. June 1954. DLC(TL555.A1A4, v. 25)

Eight subjects, wearing light-proof goggles, were placed, in turn, on a chair capable of constant rotation. In each subject it was demonstrated that, as rotation began, nystagmus occurred until the angular velocity became constant, then the nystagmus disappeared. When a subject quickly bent his head forward, nystagmus would again occur and last until constant angular velocity of the head was established once more. Upon raising the head, a reverse nystagmus occurred which disappeared within two minutes if the position of the head remained fixed. A sudden arrest of the chair motion elicited a post-rotatory nystagmus. Control experiments conducted in a stationary chair produced no nystagmus when the head was lowered or raised. Thus, it was shown that the accelerative change in the angular velocity of a subject's head when he raises or lowers it while rotating at a constant angular velocity, produces additional endolymph flow in the semicircular canals. From this evidence, the author concluded that the sensations of tilting or nausea are caused by the excitation of the semicircular canal system.

3447
Schults, J. E.,
and H. R. Anderson
ACUTE MYOCARDIAL INFARCTION OCCURRING IN FLIGHT AT 12,000 FEET. — U.S. Armed Forces Med. Jour., 5 (10): 1509-1513. Oct. 1954. DLC (RC970.47, v. 5)

Following a summary of cardiovascular disturbances incurred at high altitudes as a result of hypoxia, a case history is reported of a young pilot, 33 years old, who sustained acute anterior myocardial infarction while flying at 12,000 ft. altitude without oxygen in an unpressurized military plane. The only cardiovascular abnormality reported prior to admission to the hospital was a blood pressure of 140 systolic and 90 diastolic recorded during an annual physical examination several months before the incident. These blood pressure values are still just below the upper limit of acceptability for military pilots. Although some symptoms indicated a degenerative process in the myocardium, he showed no evidence of decompensation or arrythmia. Response to treatment was satisfactory. At the end of hospitalization, his blood pressure was 100/60, and his cardiac reserve was considered good. Following discharge, the pilot was permanently suspended from flying duties. The case is discussed in the light of the Kreienberg and Winter theories on blood pressure response of normotensive and hypotensive subjects to hypoxia.

3448
Schulzinger, M. S.
ACCIDENT PRONENESS. — Indus. Med. and Surg. 23 (4): 151-152. April 1954. DLC(RC963.A37, v. 23)

The currently accepted theory that most accidents are sustained by a small fixed group of "accident-prone" individuals is open to question. On the basis of clinical experience and studies, the writer suggests that most accidents are due to relatively infrequent solitary experiences of large number of individuals. The total number of accidents suffered by those who injure themselves year after year, over a period of three or more years, is relatively small. The frequently observed unequal distribution of accidents appears, among other things, to be due to the unequal liability to accidents on the basis of age and sex, to transient or prolonged states of physical, physiological or psychological stress, to chronic "accident-proneness", and to chance. The evidence indicates that if the period of observation is sufficiently long, the "small group of persons who are responsible for most of the accidents" is essentially a shifting group of individuals with new persons constantly falling in and out of the group. This view is supported by a study of aircraft

pilots who have had two or more accidents in the air. It shows that although there is an increased probability of having another accident within 30 days after the first one, the chance of having another accident decreases as time passes. It seems to be more nearly correct to speak of varying degrees of "accident-proneness" rather that of the presence or absence of proneness. (Author's summary, modified)

3449
Schwab, R. S. 1953
MOTIVATION IN MEASUREMENTS OF FATIGUE. — In: Floyd, W. F. and A. T. Welford, ed. Symposium on Fatigue, p. 143-148. London: H. K. Lewis and Co., Ltd., 1953. DNLM

In order to separate the effects of different motivational levels from the level of muscular performance,a procedure of electronic ergography was developed to check human fatigue curves. This procedure also allows to check voluntary ergograms, particularly in chronic fatigue cases, when lowered efficiency is primarily due to psychological factors.

3450
Sealambro, A. 1953
[THERAPEUTIC USE OF ALTERNATING CURRENTS WITH AUTOMATIC FREQUENCY VARIATIONS IN AVIATION MEDICINE] Impiego terapeutico delle correnti ondulatorie a variazione automatica di frequenza in medicina aeronautica. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 510-516. In Italian, with English summary (p. 516).
DNLM (W3.C0943a)

Electrotherapy (using an apparatus producing currents with automatic frequency control) of disorders of flight personnel is briefly described. Tabulated results demonstrate recovery in 95% of the cases (120) treated for rheumatic pain, articular, neural or muscular injuries, visceral colic and other disorders. Since electrotherapy is necessary only for a short period, the affected personnel may be restored to duty in a minimum amount of time.

3451
Sedov, M. A.
[WE ARE FLYING TO THE MOON]
Letim da lunu. — Znanie sila (no place), 1954 (10): 16-17 1954. In Russian. DLC (T4.Z5, v. 1954)

The author of this paper bears the title of "Commander of Space Ship 'Luna-1'." The paper is a popular description of an imaginary flight to the moon, based on information gathered through scientific observation and recording of phenomena encountered by numerous passenger-free rockets and "space ships" sent beyond the atmosphere of the Earth.

3452
Sellers, E. A., 1952
and R. W. You
EFFECTS OF COLD ENVIRONMENT ON DEPOSITION OF FAT IN THE LIVER IN CHOLINE DEFICIENCY. — Biochem. Jour., 51 (4): 573-576. July 1952 DLC (QP501.B47, v. 51)

When a hypolipotropic diet of moderate fat content (20%) is fed to rats acclimatized to a temperature of 1.5 ± 1°C., excessive deposition of fat in the liver is effectively prevented. This "pseudolipotropic" action is a matter of degree, however, for with a high-fat (50%), low-choline diet, lipids accumulate in the liver. The fat content of the liver is significantly less than in control animals kept at room temperature on the same type of diet. The pseudolipotropic action of cold is demonstrable in acclimatized as well as in normal animals, and is apparently not mediated to a recognizable extent through either the thyroid or the adrenal gland. (Authors' summary)

3453
Senders, V. L.,
and J. Cohen
THE EFFECTS OF ABSOLUATE AND CONDITIONAL PROBABILITY DISTRIBUTIONS OF INSTRUMENT SETTINGS

ON SCALE READING: REPEATED EXPOSURES OF THE SAME SETTING. — Antioch Coll., Yellow Springs, Ohio (Contract AF 18(600)-50); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-253, Oct. 1954. vi +45 p. (RDO no. 694-31). AD-54 628

PB 125145

The first of a series of experiments designed to investigate the effect on scale reading of the sequence of pointer settings, and responses to them, is reported. This paper analyzes response sequences in the limiting case in which repeated successive exposures of the same stimulus are administered. Under these conditions information transmitted from scale settings to responses increases with exposure number in a manner approximately described by a growth function. When the same stimuli are presented in random sequence, only a very slight, approximately linear increase in transmitted information is found. Increasing the exposure time or the number of graduations on the scale increases the amount of information transmitted, and increasing the exposure time also increases the rate of gain of information. Mean square error decreases with successive exposures, and the correlation between the logarithm of this measure and information transmitted is -.86. A research program to investigate the effects of different kinds of absolute and conditional probability distributions on instrument reading is proposed. (Authors' abstract)

3454
Senders, V. L.

ON READING PRINTED MATTER WITH INTERRUPTED LIGHT. — Jour. Exper. Psychol., 47 (2): 135-136. Feb. 1954. DLC (BF1.J6, v. 47)

The author discusses Gerathewohl and Taylor's report on reading printed charts of decreasing contrast of interrupted light. No indication of the Brücke-Bartley effect was found, as the readability of low-contrast print was not increased. Instead, the results indicated decreased print visibility nearing that produced by the Talbot effect. A re-examination of the data given in the above report shows that, when the logarithm of luminous reflectance required is plotted against the logarithm of the light-time fraction, it does not result in a straight line with a slope of minus one, which is the Talbot contour. In accordance with the author's previous experiments, the Gerathewohl and Taylor data merely indicate, that regardless of the flash frequency used, less energy is required for resolution when the light is interrupted than when it is steady. The decreased energy requirement does not result from the Brücke-Bartley effect.

3455
Severin, G.

AERO-MEDICAL ACCOMPLISHMENTS IN SWEDEN DURING THE PAST QUARTER OF A CENTURY. — Jour. Aviation Med., 25 (5): 462-465. Oct. 1954. DLC (TL555.A1A4, v. 25)

Developments in aviation medicine in Sweden are reviewed. In 1945, the first decompression chamber was built in Sweden; this chamber was used for both routine testing and research. In 1946, there was created a State Research Committee on aviation medicine (advisory agency for Air Force and industry); the year 1948 marked the inclusion of naval medicine within the jurisdiction of the Committee. This organization is composed of civil physiologists, Air Force surgeons, and military experts concerned with air safety and related equipment. The Caroline Medical Institute, the Central Gymnastic Institute, and the University of Lund provide laboratories for the use of the Committee. Among recent developments have been: an electrical measuring device for giving a continuous recording of the nitrogen percentage of the air in the alveoli; studies on hemo-respiration under varying

pressures of oxygen and carbon dioxide and on the influence of intrapulmonic positive pressures on breathing and circulation; investigations of heavy physical work and dehydration: and studies of chemoreceptor activity at low oxygen pressure before and after acclimatization and of the respiratory response of human subjects to physical work under such conditions.

3456
Shackel, B.
THE HUMAN LIMBS IN CONTROL. I. APPARATUS: OPTIMUM EXPERIMENTAL CONDITIONS. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A.P.U. 214/54, April 1954. 17 p. AD 119 044 UNCLASSIFIED

A description is presented of the positional control system and recording apparatus used to investigate performance in a one-dimensional compensatory tracking situation. Tests to determine optimum experimental conditions and optimum type and length of training are described; the need for an arm support is demonstrated, and the deterioration of performance is shown during tracking runs of five minutes' duration.

3457
Shapiro, R. 1952
THE ATMOSPHERIC PRESSURE AT THE SURFACE OF MARS. — In: Lowell Observatory, The study of planetary atmospheres, p. 77-85. Issued by Geophysical Research Division, Air Force Cambridge Research Center, Mass., Sept. 30, 1952. (Contract AF 19 (122)-162). AD 10 609 UNCLASSIFIED

An improved method is described for evaluating the surface pressure of Mars from the physical construction of a convective cloud. (Author's abstract)

3458
Shaw, C. C.
ON THE DYNAMICS OF MOTION SICKNESS IN A SEAWAY. — Scient. Monthly, 78 (2): 110-116. Feb. 1954. DLC (Q1.S817, v. 78)

Abridged version of this paper in Military Surgeon, 114 (5): 347-350. May 1954. DLC (RD1.A7, v. 114)

The mechanical causal agent of motion sickness has been shown to be identical on land, at sea, and in the air. It can be simply stated as the sum of the linear accelerations and decelerations along and around the longitudinal, lateral and vertical axes. Each of the "six degrees of freedom" may thereby contribute to motion sickness. However, the combined effects of surge, sway, and yaw are almost negligible. Generally motion sickness, when it occurs, is induced by the sum of the linear accelerations of pitch, roll, and heave, of which the latter is the greatest at sea.

3459
Shaw, W. C.
HIGHER ALTITUDES BRING NEW DEMANDS. — Aero Digest, 69 (4): 50-52. Oct. 1954. DLC (TL501.A292, v. 69)

The technical problems of the design and integration of airconditioning systems into the air frame structure design are discussed. This system is expected to provide among other functions pressurization of the cockpit, maintenance of the cockpit temperature and humidity, ventilation of the pressurized suit worn by the pilot, and removal of excess moisture and noxious gases. Certain requirements are listed as essential with respect to oxygen equipment in the event of sudden failure of the pressurization system at high altitudes.

3460
Shaw, W. J.
THE EFFECT OF CONTINUED PERFORMANCE IN A TASK OF AIR TRAFFIC CONTROL. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 883, Jan. 1954. 9+3 p. AD 43 009 UNCLASSIFIED

Studies were made on fatigue in relation to one of the highly skilled and trained mental tasks of Air Traffic Control Officers. A test was devised on a particular aspect of the controller's task which could be isolated and simulated in all essential respects on a synthetic control board. The test was given in the Air Traffic Operations room to controllers immediately before and after watch spell. Three subjects (two aged 32; one, 40) were tested over an eight-week period. It was pointed out that while the tests could be considered a close sample of the task performed on the actual controller's board, it was clear that the tests were not as exacting as a similar period of peak traffic. Between the three subjects and within the 27 tests administered, there was no evidence of a breakdown in consistency in the after-watch situation which might indicate the onset of fatigue. It was concluded that under the conditions of the experiment the possibility exists that with the highly trained skill of the controller in this task a point of impairment is not reached even though fatigue may be present.

3461
*Shcheglova, A. I. 1953
[CHANGES IN THE METABOLIC PROCESSES OF RODENTS AT LOW ENVIRONMENTAL TEMPERATURES] Izmeneniia obmena veshchestv u gryzunov pri nizkikh temperaturakh sredy. — In: Opyt izucheniia regulîatsii fiziologicheskikh funktsiĭ v estestvennykh usloviîakh sushestvovaniia organizmov. Izdatel'stvo Akademiia Nauk S.S.S.R., Moskva-Leningrad: 1953, p. 19-34. In Russian.

The effects of prolonged and repeated exposure to low temperatures on metabolic processes of hybernating and non-hybernating rodents were studied. Tests were performed on white rats and a species of small susliks, varying the temperature between +20° and -16° C. The results showed that changes in the metabolic processes varied with the stage of cooling. In the early stages of cooling, the metabolic rate rose between 70 - 90% in all animals, and the body temperature fell by 6 - 7° C. in the rats and by 10-11° C. in the susliks. Further loss in body temperature was accompanied by a lowered rate of metabolism. Extending the state of hypothermia over 8-12 hours resulted in changes in the rate of metabolic processes of rats and susliks, showing a tendency to parallel the degree of cooling; lowering of the metabolic rate proceeded in steps alternating with rises, which the author regards as a manifestation of physiological compensation to the cooling of the body. Results of repeated hypothermia tests showed that a single cooling effect left certain residuals in the form of weakened resistance to succeeding body cooling, frequently resulting in the death of the animal. The general changes in the metabolic processes of rats and of susliks followed identical courses. Lowering the body temperature to 7-10°C. caused the rats to die of hypothermia, while the susliks went into a state of numbness and a lowered state of life functions, a condition normal to reaction to cooling in susliks. (Translation of : Referativnyĭ zhurnal, Biologiia, 1954. Abstract No. 3744)

3462
*Shcheglova, A. I. 1953
[EFFECTS OF SURROUNDING TEMPERATURE ON THE DAILY ACTIVITY RHYTHM OF SOME RODENTS] Vliianie temperatury sredy na sutochnyĭ ritm aktivnosti nekotorykh gryzunov. — In: Opyt izucheniia reguliatsii fiziologicheskikh funktsii v estestvennykh usloviiakh susvhestvovaviia organizmov. Izdatel'stvo Akademiia Nauk S.S.S.R. (Moskva-Leningrad), 1953: 170-182. In Russian.

Experiments were performed during the fall-winter months on 30 yellow-throated mice (Apodemus flaviocolis) (I), 20 reddish-brown field mice (Glethironomys glareolus) (II), and 30

large sand mice (Rhombomys opimus) (III). Except for changes in temperature of the air, all other conditions were the same. Daily activity rhythm was recorded by means of an actograph specially constructed for the study. The results showed that mice of Group I were nocturnally active and were characterized by a monophase activity rhythm; mice of Groups II and III manifested a polyphase daylight activity. At temperatures ranging between -5° and +30° the character of daylight activity of all mice remained basically unaffected, with some minor exceptions: at -5° animals remained within their nests 7-10% of the time, and at +25° they remained in the nest 23-30% of their active time. Intensity of activity was highest at 15-25°C. At 35°C. the activity of the mice became disorderly and disorganized due to arising conditions of hyperthermy. Under such conditions mice of Groups I and III manifested an incessant activity, and mice of Group II manifested a considerably restricted activity intensity.

The author places particular emphasis on the complexity of the reflex mechanism of the daily activity rhythm, which in her opinion, depended not only on changes in temperature, but on other factors of external environment, including nutritional conditions. (Referativnyĭ zhurnal, Biologiia, 1954. Abstract No. 3609)

3463
Shrinagesh, M. M.

THE SCOPE OF AVIATION MEDICINE IN INDIA. — Aero Med. Soc. Jour. (New Delhi), 1 (1): 1-8. April 1954. DNLM

The history of the Indian Air Force is briefly reviewed, and aeromedical problems in India are discussed. Most types of aircraft in the Indian Air Force have been acquired second-hand from abroad. Yet, some of the fundamental problems associated with them have not yet been solved, e.g., escape from the Vampire. Psychological aspects of accident prevention, pilot selection, and human limitations as reported in foreign sources, are, as a rule, related to the prevailing situations in these countries. Therefore solutions of problems applicable to the U. S. Air Force or the Royal Air Force may not have the same success in India even if the principles involved can be applied. Because of security restrictions imposed on certain aspects of research in other countries, India does not have access to all new developments. The scope of aviation medicine is discussed and emphasis is placed on the need for aeromedical research. It is suggested that, as a safety precaution, backward-facing seats should be installed in commercial aircraft, and that modifications of cockpits should be made in order to better comply with Indian body measurements (in the list of causes for rejection of candidates, shortness of leg length ranks second).

3464
Shrinagesh, M. M.

SRINAGAR TO LEH. — Aero Med. Soc. Jour. (New Delhi), 1 (2): 12-17. Oct. 1954. DNLM

The implications in transporting a hypothetical heart case in a pressurized cabin from Srinagar (5450 ft. above sea level) to Leh (10,200 ft. above sea level) are discussed. The flight time is approximately 90 min. The aircraft available was a Dakota HJ-234 fitted with a pressure cabin designed to provide a differential pressure of 3.8 p.s.i., i.e., a sea level barometric pressure at 8,000 ft. Above 8,000 ft., the cabin altitude would increase above sea level. It was presumed that the individual to be airlifted would stay at Srinagar a few days before flight and become at least partially acclimatized to that altitude. Thereafter the problem consisted of flying this case in the pressurized cabin gradually and evenly from an altitude of 5,450 ft. to one of 10,200 ft. This method would insure that at no stage changes in oxygen percentage of inspired air would be abrupt, and there would be an opportunity for

gradual adaptation with increasing altitude. The use of oxygen in the cabin is contra-indicated, since it will prevent adaptation. Several air routes are described and trial flights were conducted over these. The project was eventually abandoned because of technical difficulties (take-off ability of the aircraft in a rarefied atmosphere).

3465
Shumann, L.
COMMANDING OFFICER FLIGHT SURGEON TEAM IN MARINE AVIATION. – Contact (Pensacola), 12: 19-21. 1954. DNLM

A general discussion is presented of the special position occupied by the flight surgeon in a Marine Corps aviation squadron in maintaining the morale and health of pilots and squadron personnel. Participation in and familiarity with the functions and problems of other departments of the squadron are essential for successful performance.

3466
Siebens, A. A.,
R. E. Smith, and C. F. Storey
ACUTE HYPOXIA UPON PULMONARY VESSELS. – Federation Proceedings, 13 (1I): 137. 1954.
DLC (QH301.F37, v. 13)

The present report concerns 4 patients for whom reliable calculations of pulmonary blood flow show a fall with hypoxia coincidentally with a rise in pulmonary artery pressure. Method: cardiac output (Fick) and pulmonary artery pressures (capacitance manometer) were determined at rest, during exercise with room air breathing, and during exercise with the patient breathing a gas mixture sufficiently low in oxygen concentration to lower the saturation of arterial blood to approximately 80%. Exercise was continued for 10 min. prior to collection of blood and gas samples, in as much as experience had proven changes in oxygen consumption, minute ventilation, and respiratory gas exchange ratio to be small following minute 7. Results: in each patient exercise in room air was associated with an increase in pulmonary blood flow (minimum 3.23 1/min., maximum 5.03 1/min.), a rise in mean pulmonary artery pressure (minimum 5 mm. Hg, maximum 8 mm. Hg), and a small fall in 'resistance'. Exercise during low oxygen breathing, though associated with lower pulmonary blood flows, produced further elevations in mean pressure (minimum 6 mm. Hg, maximum 12 mm. Hg) and sharp rises in 'resistance'. Conclusion: acute hypoxia produced pulmonary vasoconstriction in these 4 patients. (From the authors' summary)

3467
Sieker, H. O. 1952
DEVICES FOR PROTECTION AGAINST NEGATIVE ACCELERATION. PART I. CENTRIFUGE STUDIES. – Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 52-87, Part 1, June 1952. vi + 15 p. (RDO no. 695-69). AD 2135
PB 142259

Previous experimental work has shown that negative acceleration is tolerable within certain physiological limits. This report summarizes studies in which human subjects were exposed to negative acceleration with and without protection. The tolerance limit for negative acceleration in unprotected subjects in the upright seated position was found to be 2.5 g. The acceleration was limited to this level by the subject's discomfort and the bradycardia noted in the electrocardiogram. At 3 g, in addition to marked discomfort, conjunctival hemorrhages and cardiac asystoles were noted. When the subject in the upright seated position was protected by means of counterpressure about the head and neck, the tolerance to negative acceleration was increased to 5 g. The tolerance limit for negative acceleration was found to be 4 g in the negative-g aspect of the USAF prone position bed. (Author's abstract)

3468
Sieker, H. O., 1953
E. E. Martin, O. H. Gauer, and J. P. Henry
A COMPARATIVE STUDY OF TWO EXPERIMENTAL PNEUMATIC ANTI-G SUITS AND THE STANDARD USAF G-4A ANTI-G SUIT. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 52-317, Feb. 1953. vi + 18 p. (RDO no. 695-76). AD 12 716
UNCLASSIFIED

Two new types of pneumatic anti-g suits have been examined which apply pressure to a greater portion of the lower part of the body than the standard C-4A suit. The two suits consist of (1) complete coverage trousers composed of a connected system of circumferential bladders and (2) full pressure trousers. These two types of anti-g suits provide 0.7 to 0.9 g more protection against acceleration than the standard G-4A anti-g suit which afforded 1.8 g protection. A comparative study of the effect of the three types of protection on arterial pressure, venous pressure and vertical heart-to-head distance was undertaken on human subjects. During acceleration the inflation of the two experimental suits maintained mean arterial pressure at eye level and venous pressure at heart level higher than did the G-4A suit under the same conditions. The shortening of the heart-to-head distance was not significantly different with the three types of protection. It is believed that greater protection is afforded by the experimental anti-g suits because they apply greater pressure evenly to a larger portion of the lower part of the body than the G-4A suit is able to do. By this means they increase peripheral arterial resistance and venous return to the heart more effectively than the G-4A anti-g suit. The two experimental suits have been shown to be an effective and comfortable type of protection against acceleration. Within the limits of blackout or comfort tolerance of the subject, these suits have been demonstrated to be safe for human use. Moreover, they may be incorporated into a combination altitude, anti-g and exposure suit. These new anti-g suits have the disadvantage of being bulky, poorly ventilated and in the case of the full pressure suit, difficult to don. It is concluded that further study, testing, modification and development of these anti-g suits should continue. (Authors' abstract)

3469
Sieker, H. O.,
O. H. Gauer, and J. P. Henry
THE EFFECT OF CONTINUOUS NEGATIVE PRESSURE BREATHING ON WATER AND ELECTROLYTE EXCRETION BY THE HUMAN KIDNEY. — Jour. Clinical Investigation, 33 (4): 572-577. April 1954.
DLC (R11.J67, v. 33)

Essentially the same as item no. 2095, vol. 2.

3470
Silverman, R. E.
ANXIETY AND THE MODE OF RESPONSE. — Jour. Abnormal and Social Psychol., 49 (4): 538-542. Oct. 1954. DLC (RC321.J7, v. 49)

This experiment investigated the influence of shock threat on the responses to incidental auditory stimuli and relevant visual stimuli. The subjects were trained to perform a visual discrimination task and were then tested for discrimination accuracy. The subjects who performed the discrimination test in the presence of incidental auditory stimuli were tested for recall and recognition of these stimuli. The results indicated that subjects exposed to the threat of electric shock manifested less incidental learning than subjects not exposed to shock threat. The shock-threat condition in the presence of the incidental stimuli impaired discrimination, but the shock-threat condition alone improved the accuracy of discrimination. The results were interpreted as lending

3471
Simmons, R. F.,
N. D. Warren, I. L. Rodman, and R. R. Morman
THE PREDICTION OF ACCIDENT RATES FROM BASIC DESIGN FEATURES OF USAF AIRCRAFT. — Psychological Services, Inc., Los Angeles (Contract AF 18(600)-447); issued by Human Factors Operations Research Labs., Bolling Air Force Base, D.C. HFORL Report no. TR-54-8, Jan. 31, 1954. vi + 32 p. AD 49 234 PB 117054

This research analyzed design and performance features of USAF aircraft in relation to pilot-error and non-pilot-error accident rates. It emphasized primarily the extent to which each type of accident rate could be predicted from knowledge of design and performance characteristics of each model. Practically all operational models and series of USAF aircraft were used in the analysis. Three complementary statistical methods - significance tests, linear, and curvilinear correlational analyses - were used to arrive at the conclusions. Tables and graphs for use in predicting the accident rates of new aircraft models under certain restricted circumstances were developed. (Authors' summary)

3472
Simon, C. W.
EFFECTS OF STRESS ON PERFORMANCE IN A DOMINANT AND A NONDOMINANT TASK. — Antioch Coll., Yellow Springs, Ohio (Contract W33-038-ac-19816); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-285, June 1954. v + 41 p. (RDO no. 694-31). AD 53 977 PB 117359

Eighty male college students were divided into four equal groups. One group practiced for 96 trials on a "dominant" task; the remaining groups practiced for 96 trials a day for one, two, or three days respectively on a "nondominant" task. The task - proper positioning of a light in an arc of lights by turning a rotary knob - was termed "dominant" when a clockwise movement of the control moved the light clockwise. The task was termed "nondominant" when a clockwise movement of the knob moved the light counterclockwise. Following the practice session, an experimental stress period was introduced. One half of each group worked under mildly stressful conditions in which they were required to perform a compensatory pursuit task while responding at intervals to the positioning task. The other half worked under more severe stress, performing the pursuit task while simultaneously solving simple arithmetical problems. Stress as defined above resulted in more reversal errors for subjects performing on the originally nondominant task than for those performing on the originally dominant one, although both groups had practiced to an apparently equal performance level previously. Response time and individual response time variability, one indirectly related to the original dominance measure, reflected this tendency under mild stress only, while overshoot errors showed no differential effects of stress. Additional practice on the nondominant task was insufficient in this experiment to decrease the disruptive effects of stress on performance. The results are discussed in terms of current learning theory. (From the author's abstract)

3473
Simon, G. B.
EVALUATION AND COMBINATION OF CRITERION MEASURES BY FACTOR ANALYSIS: A STUDY OF B-25 PREFLIGHTS BY AIRPLANE AND ENGINE MECHANICS. — Air Force Personnel and Training Research Center. Training Aids Research Lab., Chanute Air Force Base, Ill. May 1954. v + 80 p. (Project no. 507-012-0003). AD 39 948 UNCLASSIFIED

A total of 21 criterion measures were developed from the definition of

the criterion series for the mechanic's "pre-flighting" of B-25, a subjob within the area of general airplane and engine maintenance in the Air Force, and the systematic observation of the behaviors on the job. The B-25 preflight check list was developed to provide a form for recording these observations. A basic sample of 292 B-25 mechanics with a supplementary group of 43 mechanics were used as subjects in this study. The statistical treatment of the data included determination of variance in the criterion measures, tests of reliability considering various sources for errors, intercorrelations among the criterion variables, and factor analysis by the principal axes method. Conclusions drawn are generalizable to other subjobs within the area of aircraft maintenance.

3474
Simon, J. R., 1952
T. W. DeCrow, R. S. Lincoln, and K[arl] U. Smith
EFFECTS OF HANDEDNESS ON TRACKING ACCURACY. — Perceptual and Motor Skills Research Exchange, 4 (2): 53-57. June 1952. DNLM

Experiments were conducted to test the tracking accuracy of the preferred and non-preferred hand in right- and left-handed individuals in both direct and aided tracking. An apparatus was utilized in which tracking was accomplished by following a rotating target cursor with another cursor, connected to a hand wheel control. In direct tracking, a motor device drove the cursor at a rate established initially by turning of the hand wheel. Tracking performance was measured in terms of frequency and magnitude of error. No significant difference was found in tracking accuracy between left- and right-handed individuals. Furthermore, the accuracy of tracking with the non-preferred hand was not significantly different from the accuracy obtained with the preferred hand in either of the two groups of individuals. Direct and aided tracking gave results similar in regard to the effects of handedness and hand-usage. Results of this study suggest, therefore, that undimensional visual tracking using a handwheel control differs from certain other psychomotor skills, in that neither handedness nor hand usage significantly affects accuracy. (Authors' summary, modified)

3475
Simons, D. G.
METHODS AND RESULTS OF ONE YEAR OF BALLOON FLIGHTS WITH BIOLOGICAL SPECIMENS. — Jour. Aviation Med., 25 (4): 380-387. Aug. 1954. DLC (TL555.A1A4, v. 25)

A history of the progress in the development of successful balloon flights carrying biological specimens is described. By employing a coded signal from an enclosed radio transmitter much of the early difficulty in tracking the balloon and gondola has been eliminated. The successful use of a radio-controlled mechanism to separate balloon and gondola gives greatly increased control over the flight time. Carefully controlled environmental conditions within the gondola have permitted four successful flights above 85,000 feet at a latitude north of 55° for a total of 56 1/2 hours' exposure. During these flights, the physiological stress upon the specimens was at a minimum. Examination of the brains of hamsters indicated that there was no histologic evidence of hits of nuclei either of the iron group or the carbon-nitrogen-oxygen group (data on mice will be reported elsewhere). Such evidence is tentative pending further flights designed to last 100-150 hours total duration at altitudes of 100,000 to 116,000 feet within the latitudes (north of 55°) receiving numerous cosmic radiations of the iron group. The author also proposes the use of "track plate monitoring" to determine the specific region of the termination of the iron particles in tissue in future studies.

3476
Singleton, W. T.
THE CHANGE OF MOVEMENT TIMING WITH AGE. — Brit. Jour. Psychol. (London), 45 (3): 166-172. Aug. 1954. DLC (BF1.B7, v. 45)

Two experiments were performed to test the hypothesis that the decrement with age observed in mobility measures may be due to increased time taken by central processes. In the first experiment, ten males of each age decade, in the range of 20 to 70 years, were used as subjects. The task involved moving a lever on a four-choice display board with light signals. The level of difficulty was increased by having the subject move the lever in opposite directions to extinguish a light signal. In the second experiment 48 male subjects, ages distributed over the same age range as in the first experiment, moved a control on a two-choice display in direct alignment. The information concerning the next action became available only when the previous action was completed, and degrees of freedom were strictly defined by the apparatus. For each subject the time spent was broken down into component parts: (a) stationary time, and (b) moving time. In general, the results suggest that performance of older men on simple unfamiliar perceptual motor skills tends to be slower than that of younger men due to longer times spent at points where direction of movement must be altered. It is concluded that, if the activity itself is not unduly stressful, the difference in performance times between younger and older age groups is based on longer times needed by the latter to absorb information at the central level rather than on time consumed because of deterioration of the peripheral receptor and effector processes.

3477
Sipple, W. C.,
C. H. Fugitt, W. B. Wentz, and C. F. Gell
[DEVELOPMENT OF SCINTILLATION COUNTING TECHNIQUES FOR USE IN ACCELERATION STRESS STUDIES.] — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5411, July 30, 1954. iii+10 p. (Project Report no. NM 001 060.08.01). AD 39 396 UNCLASSIFIED

A description is made of the special laboratory facilities and instrumentation programs which were evolved for the satisfactory utilization of radioisotopes in connection with studies peculiar to acceleration physiology. A special instrumentation program has been completed whereby scintillation counting of weak gamma emitters in situ is now possible on subjects during their exposure to acceleration stress on the human centrifuge. (Authors' summary)

3478
Siri, W. E.,
C. Reynafarje, N. I. Berlin, and J. H. Lawrence
BODY WATER AT SEA LEVEL AND AT ALTITUDE. — Jour. Applied Physiol., 7 (3): 333-334. Nov. 1954. DLC (QP1.J72, v. 7)

Total body water and body fat were determined in two groups of young, normal subjects, one group living at sea level, the other acclimatized to 16,000 feet. The mean values for the two groups were normal for their age range and occupations. Thus, no evidence can be gained from this study elucidating the changes in body water and body fat during and after acclimatization to low oxygen tension. Further studies on acclimatization will be carried out.

3479
Sjöstrand, F.
[FUNDAMENTAL KINESIOLOGIC PRINCIPLES REGARDING THE ADJUSTMENT OF HUMAN BODY POSTURE] Principiella synpunkter på rörelseapparatens disponering i skilda kroppsställningar. — Nordisk hygienisk

tidskrift (Lund), (7-8): 141-146. 1954. In Swedish, with English summary (p. 146). DNLM

Stability of the erect, relaxed standing posture is maintained by the antagonistic action of the force of gravity and a select group of muscles in continuous contraction. If sufficiently pronounced, this continuous muscular contraction may affect local blood circulation. On the other hand, continuous muscular relaxation or uniform contraction may reduce venous blood flow by reducing the efficiency of the venous pump, which may, in turn, affect the general blood circulation. Based on these factors, conditions existing within the joint cartilage are noted, and general rules for body posture during work are defined. (Author's summary)

3480
Sloan, L. L.,
and A. Altman
FACTORS INVOLVED IN SEVERAL TESTS OF BINOCULAR DEPTH PERCEPTION. — A. M. A. Arch. Ophthalmol., 52 (4): 524-544. Oct. 1954. DLC (RE1.A62, v. 52)

Three tests of binocular depth perception (the Howard-Dolman test, the Verhoeff Stereopter, and a stereoscopic test developed for the Armed Forces Vision Tester) were investigated to determine what particular aspects of depth perception each one is best fitted to measure. The experimental findings support the view that uniocular clues may play a significant role in tests of binocular depth perception. Some subjects had significantly higher thresholds on the standard Stereopter than on modified tests in which there were no misleading uniocular size clues, and some with good scores on the Howard-Dolman test made poor scores on a stereoscopic test in which size and disparity clues were not in accord. The tests investigated in this study agreed in from 79-92% of the cases in their classification of subjects as having either good or poor depth perception. The following two factors were responsible for the discrepancy: (1) Underestimation of ability to perceive depth; a false finding of poor depth perception was given frequently by the Vision Tester, and occasionally by the standard Stereopter, presumably because of a conflict between size and disparity clues; on the Howard-Dolman test, lack of skill or effort in making the necessary motor adjustments resulted in one instance in a false classification of poor depth perception. And (2) overestimation of ability to perceive depth; because of the short testing distance, both the stereopter tests gave false indications of good depth perception in the case of one subject with uncorrected myopia; in one case, poor depth perception caused by intermittent loss of binocular vision was not detected by the Howard-Dolman test. The factors responsible for consistently poor depth perception on all tests were low visual acuity, suppression, tropia, and possibly heterophoria. (Authors' summary, modified)

3481
*Slonim, A. D. 1953
[THE CORTICAL MECHANISM OF HEAT REGULATION AND ITS IMPORTANCE TO PROPHYLACTIC MEDICINE] Kortikal'nyĭ mekhanizm regulîatsii tepla i ego znachenie v profilakticheskoĭ meditsine. — Sovetskoe zdravookhranenie Kirgizii, 1953, (3): 3-13. In Russian.

The origin and development of the cortical mechanism of temperature regulation in relation to external and internal environmental factors of the organism are reviewed. The author presents the results of studies of conditioned reflex effects of the environment, in particular of effects related to higher and lower temperatures — factors which help to define the "signal effect" of such influences as degree of light, cloudiness of the skies, seasonal variations of the subtropical and polar regions, etc., on thermoregulation. Experiments are outlined for the study of the effects of

wind and of different sources of heat elimination (radiation and convection). The inadequacy of chemical thermoregulation in man under conditions of negative radiation are emphasized. The importance of muscular activity in thermoregulation is discussed at considerable length, and its relation to the effect of thermic stimulation of extra- and intrareceptors is pointed out. Results of studies on the mechanism of the organisms' processes of hardening or becoming injured are also reviewed. (Referativnyĭ zhurnal, Biologiia, 1954. Abstract No. 3746)

3482
Smith, Catherine A.,
W. P. Covell, and D. H. Eldredge
THE EFFECTS OF INTENSE SOUND ON THE COCHLEA. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract AF 18(600)-58); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-21, June 1954. vii+31 p. (RDO no. 695-63). AD 35 202
UNCLASSIFIED

A detailed investigation was made of the histologic changes induced by intense sound in 280 cochleas of guinea pigs. Emphasis during this period was placed on the changes along the full length of the basilar membrane, the effects of post-exposure life on initial injury, and the reparative and degenerative processes involved. The extent of injuries was thoroughly evaluated by graphic reconstruction of the whole cochlea from stained and mounted serial sections. Rapid surveys were made by a study of mid-modiolar sections, but the representation of the field of injury was restricted. In cells which were moderately or markedly injured, degenerative changes became more pronounced, but some of the mild injuries of hair cells and supporting cells of the organ of Corti were reversible. Lesions along the basilar membrane did not increase in extent with prolonged post-exposure life. (AD abstract)

3483
Smith, G. A.,
and D. E. Havens
PILOT'S PROTECTIVE EQUIPMENT. MODEL X-3. — Douglas Aircraft Co., Inc., Santa Monica, Calif. Report no. SM 18322, April 21, 1954. 22 p. AD 36 387
UNCLASSIFIED

A pilot's protective helmet and suit were designed and tested for use with the X-3 airplane. The helmet consists of a laminated fiberglass with a liner of plastic foam and foam rubber and a plexiglas visor on a spring-loaded pivot. A slightly modified AN-13A oxygen mask is used with a thin laminated fiberglas shell; the mask contains a standard microphone. Miniature earphones are imbedded in the foam liner in the main helmet shell. A nylon neckpiece connects the helmet and accompanying suit. The suit is a modified G4A anti-g suit. The modifications consist of a main zipper down the back of the suit and a zipper for attachment of the helmet neckpiece. The front of the suit is reinforced with an extra layer of quilt-stitched nylon fabric. The helmet was subjected to a 17-in.-diam. air blast which could be varied from zero to sonic velocities and back to zero in approximately 3 sec., and to actual seat ejections and static balance runs at velocities up to M=1.08. The results indicate that the final suit and helmet design described fulfills all the necessary requirements.

3484
Smith, H. G.
THE PROVISIONING OF EXPEDITIONS IN THE FIELD: ARMY OPERATIONAL RATIONS. — Proc. Nutrition Soc. (London), 13 (1): 45-48. 1954.
DLC (TX501.N9, v. 13)

Ration packs used by troops during interruption of the normal food supply are discussed. The five different operational ration packs are described, and sample menus are given.

3485
Smith, H. P. R.
MAN AND THE AIRCRAFT WORKSPACE. — RAF Inst. of Aviation Medicine (Gt. Brit.), Farnborough. August 1954. 9 p., 1 plate. AD 73 369
UNCLASSIFIED

With the increasing complexity of modern aircraft simplification and standardisation of their workspace is of prime importance. The penalties of carrying a man are great and we should be foolish not to make the most of his unique abilities. This paper has outlined some of the factors which must be afforded to a pilot to obtain his optimum performance. Individual requirements are so numerous and diverse that many of them are bound to conflict, and the aircraft's particular role will dictate the best compromise. (Author's conclusions)

3486
Smith, Helge
STATUS OF AVIATION MEDICINE IN DENMARK. — Jour. Aviation Med., 25 (5): 457-461. Oct. 1954.
DLC (TL555.A1A4, v. 25)

Due to the occupation of Denmark during World War II, that country has had little opportunity to progress in the field of aviation medicine; the only significant aspect of medicine related to aviation which is currently being utilized in Denmark is the complete and very thorough physical and psychological examination which student pilot conscripts must undergo. An Institute of Aviation Medicine was established in 1950 but, as yet, it has existed mostly in the planning stage, due to lack of funds and a dearth of qualified flight surgeons. The author adds that permanent surgeons in the Danish military service are limited to part-time work, so that they must have a private practice in order to meet their financial obligations; thus another hindrance is added to the difficulties of the establishment of a progressive medical service for the air force. Optimistically, the author feels that the future will see this situation corrected, and that the Danish Air Force medical service will make unique contributions to aviation medicine because of the individual knowledge which can be gained about each pilot in this compact force.

3487
Smith, John
THE SCOTTISH AIR AMBULANCE SERVICE. — Practitioner (London), 170 (1015): 67-74. Jan. 1954. DNLM

The history of Scotland's air ambulance service, from its beginnings in 1933 to the present, is briefly reviewed. The decision for travel by air is made by the patient's doctor, contingent upon clinical urgency, age, or general condition of the patient. Pilots of air ambulances adhere to certain rules governing take-off, altitude, ascent, and descent. The limitations imposed are specific for certain illnesses or injuries.

3488
Solomonov, E. V.,
and R. IA. Pis'mennyĭ
[THE INFLUENCE OF STIMULATION OF THE VESTIBULAR ANALYSOR ON THE FUNCTIONAL CONDITION OF THE HEART (AS SHOWN BY ELECTROCARDIOGRAMS)] Vliîanie razdrazheniîa vestibuliîarnogo analizatora na funktsional'noe sostoîanie serdtsa (po dannym elektrokardiografii). — Vestnik oto-rino-laringologii (Moskva), 16 (4): 20-25. 1954. In Russian.
DLC (RF1.V4, v. 16)

Stimulation of the vestibular analysor of normal controls brought about only slight changes in the electrocardiograms. Similar stimulation of the vestibular analyzor of persons complaining of a heart condition brought about in a large number of subjects tested noteworthy changes which were not seen in the electrocardiograms made from the same test subjects at rest or following physical exertion.

3489

Sommer, A. V. 1952

THE PILOT IS THE LIMIT. — Aero Digest, 65 (6): 17-25. Dec. 1952.

DLC (TL501.A292, v. 65)

With the rapid development in performance and complexity of modern aircraft, the human pilot is in many instances being replaced by instrument guidance systems. High speeds and the complexity of operation of these systems make human piloting difficult and sometimes unreliable. When the speed of the aircraft surpasses the speed of nerve reaction impulses, a substitute must be found for the human pilot. The gyroscope has been proposed to serve as such a substitute. In addition to performing the mechanics of flying, gyroscopic devices, because of their stability and constancy, can be utilized to guide an aircraft to any specific point on earth, unaffected by the weather and by jamming limitations found in such guiding devices as radar. Among the problems encountered in the perfection of such a gyroscopic system, applied torques and angular momentum are the most conspicuous. Current progress towards the effective solution of the problem of torque makes the realization of accurate gyroscope-guided aircraft feasible.

3490

Soper, R. L.

THE AIR TRANSPORT OF POLIOMYELITIS PATIENTS IN MECHANICAL RESPIRATORS. — Proc. Roy. Soc. Med. (London), 47 (3): 157-159. March 1954.

DLC (R35.R7, v. 47)

Arrangements for air transportation of iron lung patients were made by the Royal Air Force because of the necessity of transporting members of the Armed Forces serving overseas, or their dependents, who had become victims of poliomyelitis. At present, only convalescent patients are transported, the patient's readiness for transport being evaluated by R. A. F. medical specialists. Since a portable cuirass-type respirator is used, the patient has to spend a minimum of 24 hours in it to become accustomed to its use in flight. In cases where the hemoglobin value is below 75% of the normal, the patients should be transfused before flight. The medical team accompanying iron lung cases consists of a specially trained R. A. F. Medical Officer, a flight nurse with knowledge of iron lung cases, and a technician. Additional equipment on the airplane should include a bronchoscope and oxygen. The final decision whether to accept the patient for flight rests with the Medical Officer accompanying the flight.

3491

Southwest Research Inst.

DESCRIPTION OF DISCRIMINATION REACTION-TIME TEST, MODEL E: TEST UNIT, CONTROL UNIT. — Southwest Research Institute, San Antonio, Texas (Contract AF 18(600)-605); issued by Air Force Personnel and Training Research Center. Skill Components, Research Lab., Lackland Air Force Base, San Antonio, Texas, [Report no. 342C-1], Nov. 30, 1954. iii +23 p. AD 53 269 (b) UNCLASSIFIED

A description is given of a discrimination reaction-time test which is used to measure the speed with which an individual can make different, prescribed manual responses to visual stimulus patterns, which vary with respect to the arrangement of their component parts. The test unit consists of a base panel which supports 4 response toggle switches, and a vertical panel on which there are 5 indicating lights. In the test, the subject is required to make 1 of 4 different manual reactions, depending on which of 4 positions in space a red and a green light occupy with respect to each other. The simultaneous lighting of a red and green light is the visual stimulus to which the candidate must respond by operating the response toggle switch which corresponds to the arrangement of the stimulus light. The lights and switches are arranged so that there is a natural correspondence between the red-green pattern and the

correct switch for that pattern. When the correct switch is actuated, the white indicating lamp is extinguished, informing the subject that his reaction was correct. The sequence of events in the test is regulated for the 4 test units by a control unit located at the test administrator's desk. Four model S-6 electric timers in the control unit indicate the score on each test unit. (AD abstract)

3492
Southwest Research Inst.
DESCRIPTION OF ROTARY PURSUIT TEST, MODEL C: TEST UNIT, CONTROL UNIT. - Southwest Research Institute, San Antonio, Texas (Contract AF 18(600)-605); issued by Air Force Personnel and Training Research Center. Skill Components Research Lab., Lackland Air Force Base, San Antonio, Texas, [Report no. 342C-1], Nov. 30, 1954. iii+17 p. AD 53 269
UNCLASSIFIED

A description is given of a rotary pursuit test which is used to measure the ability of an individual to follow accurately by the free-hand method the movement of an object moving rapidly in a repeated curved path. The test unit includes a wooden cabinet in which is housed a constant-speed motor which drives the test-unit turntable at a rate of 60 r.p.m. A threaded connector electrically connects the test stylus to the test unit. A silver target, 3/4 in. in diameter, is located on the Bakelite turntable top and is flush with its upper surface. This target and the point of the test stylus are the contact points which complete the electric circuit to the timers which indicate the test score. The sequence of events during the rotary pursuit test cycle is programmed by the mechanism of the control unit which is located at the desk of the test administrator. This mechanism starts and stops the individual test unit motors, restricts the periods during which scores may be recorded, gives an audible signal to test subjects at the start and finish of each test, provides a visual signal for the test administrator at the end of each group of 5 test trials, and indicates the score for each of the 4 test units in the test group. (AD abstract)

3493
Southwest Research Inst
DESCRIPTION OF TWO-HAND COORDINATION TEST, MODEL E: TEST UNIT, CONTROL UNIT. — Southwest Research Institute, San Antonio, Texas (Contract AF 18(600)-605); issued by Air Force Personnel and Training Research Center. Skill Components Research Lab., Lackland Air Force Base, San Antonio, Texas. [Report no. 342C-1], Nov. 30, 1954. iii+12 p. AD 53 269 (a)
UNCLASSIFIED

A description is given of a two-hand coordination test which was designed to measure the ability of an individual to coordinate the movements of both hands. The apparatus consists of 4 individual test units; a test table on which the 4 test units are mounted; and a control unit which controls the presentation of the test to the 4 test units, and indicates, separately, the score from each unit. The test subject stands before the test unit, and grasps two hand cranks which are located at the left and front portion of the unit. The individual is required to move a scoring button by simultaneously manipulating the two hand cranks in such a manner that a button is kept in contact with a small round target which moves continuously at varying rates of speed along an irregular pathway in a horizontal plane. The score for the test is calculated on the basis of the total time (in 0.01-min. units) during which the scoring button was maintained in contact with the moving target throughout eight 1-min. test trials. (AD abstract)

3494
Spealman, C. R.
INCIDENCE, CLASSIFICATION AND NATURE OF ERRORS MADE BY CREWS IN AIR CARRIER (AIRLINE) ACCIDENTS. — Jour. Aviation Med., 25 (6): 605-611. Dec. 1954.
DLC (TL555.A1A4, v. 25)

A large sample of errors (109) made by the crews in all air carrier accidents during 1948-1951 was classified according to whether the errors occurred under routine or non-routine (emergency) conditions. The errors which occurred under routine conditions were classified further: voluntary (errors made knowingly and deliberately) and non-voluntary. The classification is an attempt to direct attention to the set or attitude of the crew at the time the error occurred. The most numerous errors (39) took place under routine conditions and were of a voluntary nature. Non-voluntary errors occurring under routine conditions numbered 23; under non-routine conditions, 22. Of the errors remaining, 21 were unclassifiable and 4 involved more than one person. The voluntary errors accounted for 56% of the fatal accidents, the non-voluntary for only 9%. 23% of the total accidents involving one or more deaths could be attributed to errors which happened under non-routine conditions. A separate tabulation of fatal accidents showed that pilot error was the contributing factor in 43 of the 77 fatal accidents; of these errors, 22 were voluntary, 4 were non-voluntary, and 6 occurred under non-routine conditions, while 11 could not be classified. (Author's summary, modified)

3495
Spector, H.,
and M. S. Peterson (editors)
NUTRITION UNDER CLIMATIC STRESS: A SYMPOSIUM SPONSORED BY THE QUARTERMASTER FOOD AND CONTAINER INSTITUTE AND QUARTERMASTER RESEARCH AND DEVELOPMENT COMMAND, U. S. ARMY QUARTERMASTER CORPS. — Nat. Acad. of Sci. — Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C. May 1954. vi + 205 p.
AD 67 453 PB 117996

Pertinent papers of this symposium (held at the National Academy of Sciences, Washington, D. C., December 4-5, 1952) have been abstracted separately as items no. 2341, 2393, 2483, 2539, 2586, 2640, 2689, 2914, 2923, 2990, 2991, 3208, 3210, 3211, 3279, 3351, 3417, and 3655.

3496
Spurr, G. B.,
B. K. Hutt, and S. M. Horvath
PROLONGED HYPOTHERMIA IN THE DOG. — Amer. Jour. Physiol., 178 (2): 275-282. Aug. 1954.
DLC (QP1.A5, v. 178)

Prolonged, stable low body temperatures were produced for an average of 10.35 hours (1-34 hours) in 13 of 26 experiments on dogs. The procedure utilized to induce and maintain hypothermia consisted of an initial phase, environmental temperature about -10° C., and a second phase during which the ambient temperature was raised to about 22° C. Thereafter, the environment was maintained 3-4° below the rectal temperature in those experiments in which stable rectal temperatures were established. The stable group exhibited a significantly slower rate of cooling during the second phase. The average variation in rectal temperatures during the phase of stable low body temperatures was ±0.2° C. The gradient between rectal and mean skin temperatures in the stable animals was similar to the same gradient in these animals under control conditions. However, the gradient between the mean skin temperature and the environmental temperature, necessary to bring about loss of the small quantity of heat being produced by metabolic processes, was less during the stable period than under control conditions. The deaths of the 14 animals not surviving the hypothermia were the results of respiratory arrest in six experiments, ventricular fibrillation in five, respiratory arrest followed by ventricular fibrillation in two, and sudden cardiac arrest in one experiment. (From the authors' summary)

3497
Stapp, J. P.
WHOOOOOSSH! — Flying Safety, 10 (6): 2-7. June 1954. DLC

The author recalls his experiences as a subject in a rocket sled experiment on maximum tolerance of transversal acceleration at Holloman Aero Medical Field Laboratory. A short biography of the author is included.

3498
Stein, M.
TRAUMATIC WAR NEUROSES: A SURVEY OF BEHAVIOR DISTURBANCES UNDER COMBAT STRESS AND THEIR PROPHYLAXIS AND TREATMENT. — Neuropsychiatry, 2 (1): 18-42. Spring 1952. DLC (RC321.N43, v. 2)

The author reviews the research on behavior pathology precipitated by combat stress situations and the methods of treatment developed in the two world wars. 18 refs.

3499
Stevenson, J. A. F.,
and R. H. Rixon
EFFECT OF ENVIRONMENTAL TEMPERATURE, DIET AND STARVATION IN THE RAT [Abstract]. — Revue canadienne de biologie (Montreal), 13 (1): 91. March 1954. In English.
DLC (QH301.R47, v. 13)

The effects of various diets, starvation, and cold on the glycogen metabolism, water intake, and body and organ weights of rats were studied experimentally.

3500
Stewart, W. K.
ACUTE ANOXIA. — Proc. Roy. Soc. (London), 143 (910): 5-8. Dec. 1954. DLC (Q41.L7, v. 143)

Acute fulminating anoxia occurs on exposure to altitudes of 25,000 ft. or above, when the desaturation of the arterial blood may continue after the subject has already become unconscious. The progressive reactions are similar to those observed at lower altitudes and related to the degree of fall of oxyhemoglobin saturation in arterial blood. The main symptoms are gross muscular incoordination, tremors, jactitation, and unconsciousness. The average time reserve of consciousness has been estimated to be between 5 to 7 min. at 25,000 ft. However, the onset of decreased psychomotor efficiency varies from 45 sec. to 165 sec. and is related to the rate of desaturation of the arterial blood. Unconsciousness is always imminent when the arterial saturation falls below 60%. At 40,000 ft. the mean time reserve of consciousness falls below 30 sec. This degree of acute anoxia is associated with a relative excretion of oxygen in the expired air. Circulatory failure appears to be secondary to loss of cortical function as the blood pressure is maintained. The ability of the peripheral circulation to maintain itself is an important factor in the reported cases of survival following prolonged unconsciousness. In fact, apparent full recovery is normally achieved in non-fatal incidents. The author concludes that artificial respiration with inhalation of oxygen should commence as soon as possible in such cases and be maintained for a very long period. Autopsies of cases of death from anoxia reveal congestion of pulmonary, cerebral, renal, and intestinal vessels, but no congestion in muscle blood vessels. Vacuoles have been noted in the liver and in the myocardial cells.

3501
Stimmel, E. W.,
H. F. Midkiff, and H. I. Chinn
CONSTRUCTION OF AN INEXPENSIVE MOTORIZED SWING. — School of Aviation Medicine, Randolph Field, Tex. Sept. 1954. 4 p. (Project no. 21-1208-0012, Report no. 6). UNCLASSIFIED

The construction of an inexpensive, motorized swing from generally available materials is described. This apparatus is used in studies on the mechanism and prevention of motion sickness.

3502
Stoliarchuk, N. K. 1953
[EFFECT OF ENVIRONMENTAL HIGH TEMPERATURE ON CONDITIONED REFLEX FUNCTION IN WHITE RATS] Vliianie vysokoĭ temperatury sredy na uslovnoreflektornuiu deiatel'nost' belykh krys. — Zhurnal vysshei nervnoi deiatel'nosti (Moskva), 3 (6): 932. Nov.-Dec. 1953. In Russian.

DLC (QP351.Z65, v. 3)

The purpose of the study was to determine (1) the manner in which cortical processes changed and how they coordinated during a single or continuous exposure to a temperature of 35° C., i.e., at the point of thermoregulatory disturbance; and (2) cortical activity in the process of adaptation of the organism to high temperature, as well as significant points of specific individual characteristics of the course of cortical processes. Experiments were performed with 8 white rats and extended over a period of 8 weeks using the Zelennyi-Frolov method of conditioned motor reflexes, adapted for the study under discussion. The results indicated that a temperature of 35° C. depressed cortical activity in white rats, which is in agreement with findings of other authors. The latent period of conditioned reflex response was delayed, paradoxical phases appeared, and in some cases response to conditioned reflex stimulation was absent. The inhibition function became sluggish, as one manifestation of general sluggish functioning of the cortex. Slow adaptation was developing, and on the seventh week the disturbed cortical reactions returned to normal in nearly all test rats. Individual characteristics of the animals' nervous pattern markedly affected the general picture of the changes in the cortical manner of functioning described above.

3503
Stone, I.
NACA TESTS PROMISE SAFER SEAT DESIGNS. — Aviation Week, 61 (4): 30, 34. July 26, 1954.

DLC (TL501.A8, v. 61)

An experimental seat whose cushioning members absorb impact loads in a crash landing and which flexes to form a pocket cradling the passenger for protection is evaluated. Included in the specifications are provisions that the seat be: (1) strong enough to hold passengers in place; (2) capable of enough elastic deformation to absorb the shock of peak leads, but incorporating considerable frictional damping so as to prevent any elastic rebound; (3) able to withstand shocks from any direction, and (4) constructed of such materials that if breakage occurs no sharp or pointed objects will endanger the passenger. Seat characteristics and dummy action tests are also noted.

3504
Stopel, M. S.
THE CONSISTENCY OF STRESS TOLERANCE. — Jour. Personality, 23 (1): 13-29. Sept. 1954.

DLC (BF1.J66, v. 23)

A major purpose of the present investigation was to determine whether persons respond consistently to the effects of two distinct kinds of stress, designated as failure stress and distraction stress. The relationships of stress tolerance to recovery from the effects of stress, and to the variability of post-stress behavior, were also explored. The Rorschach Test and a series of Digit-Symbol Test trials were given to a group of 48 subjects in two sessions. The second session consisted of two periods, each involving a pre-stress, a stress and a post-stress phase. Twenty-four subjects received failure stress initially, followed by distraction stress, while 24 subjects experienced distraction stress initially, followed by failure stress. The results of this study lead to the following conclusions: (a) Tolerance for failure stress and for distraction stress are independent of each other; no significant relationship exists between them. (b) The amount of post-stress recovery is positively related to the degree of failure stress and distraction stress tolerance, especially during the second introduction of stress. (c) Variability of

performance during the post-stress phase is inversely related to the degree of tolerance for failure stress and distraction stress during the second introduction of stress; no significant relationship exists during the initial administration of stress. (d) During the second administration of stress there is a greater decrement in performance, regardless of the nature of the stress. (e) No significant difference exists between the effects of the particular kinds of failure stress and distraction stress employed in this study if the temporal sequence of presentation is controlled. (f) During the second introduction of stress, generalization occurs in the form of a tendency to respond in a similar manner to both stimulus conditions of stress and non-stress. (Author's summary)

3505
Storer, J. B.,
J. E. Furchner, and A. T. Krebs
SPECIFIC IONIZATION AND RELATIVE BIOLOGICAL EFFECTIVENESS OF IONIZING RADIATIONS IN MAMMALIAN SYSTEMS: APPLICATION TO PROBLEM OF COSMIC RAY HAZARDS. — Jour. Aviation Med., 25 (4): 368-377. Aug. 1954.
DLC (TL555.A1A4, v. 25)

A study was made of the relationship between relative biological effectiveness (RBE) and linear ion density (specific ionization). Relative biological effectiveness is defined as the degree to which a radiation is more or less effective than a baseline radiation. The baseline radiation selected was 250 KVP X-rays; this radiation dosage was assigned an RBE of one. The RBE for nine different biological responses in rats and/or mice was determined. These responses included: acute lethality, splenic and thymic atrophy, testicular atrophy, incidence of lens opacities, intestinal atrophy, depression of mitotic activity of the skin, depression of radioiron uptake by red cells, effect on longevity, and incidence of tumors. The lens of the eye was far the most sensitive to thermal neutrons. The RBE of 0.6 Mev protons gave a value of approximately 6 to 8 for lens opacities; the other systems studied showed a fairly uniform response with values of RBE ranging from 1.3 to 2.5.

3506
Strand, A. L.,
and P. S. Shurrager
A CONTINUOUS RECORDING ADAPTOMETER, FLICKER PHOTOMETER, CONTINUOUS WAVE LENGTH MONOCHROMATOR FOR THE STUDY OF HUMAN VISIBILITY [Abstract]. — Amer. Psychologist, 9 (8): 478. Aug. 1954. DLC (BF1.A55, v. 9)

An instrument is described which permits the continuous recording of the dark-adaptation process for various regions of the visible spectrum and conversion of the data to different energy distributions (equal energy, equal quanta, equal visibility).

3507
Stratton, K. L.
MEDICAL CARE OF AIRLINE PILOT PERSONNEL. — Jour. Aviation Med. 25 (6): 630-636. Dec. 1954.
DLC (TL555.A1A4, v. 25)

A review is presented of the maintenance health records of 304 pilot captains of American Airlines, Inc., from 1940 to 1949. The ages of the pilots ranged from 30 to 59 with the greatest number falling in the 36 to 40 age bracket. Of the entire group, 35 gave evidence of eye abnormalities which required correction (12 for distant vision and 23 for near vision); there was hearing loss in 6 cases, and 2 of the pilots had a weight loss of more than 5 pounds during this period. In addition, 2 more showed a pulse gain of over 20 points during the 10-year period; and 5 had at least a 20-point jump in their blood pressure. A comparison of the days lost due to illness throughout the years 1949 to 1953 showed that there was a loss increase in the 51-55 age group during 1953, and that, generally, the older pilots were ill

less frequently than the younger ones, but that their illnesses lasted longer. From 1949 to 1953, 4 pilots retired, 10 others became inactive (2 temporarily); throughout the entire period of the survey, 8 of the original 304 are not flying at present. The study is continuing, using the same group of subjects.

3508
Strickland, B. A.,
and V. M. Downey
THE EFFECT OF AEROMEDICAL EVACUATION ON VARIOUS CLINICAL CONDITIONS: IN-FLIGHT SYMPTOMS OF CARDIOPULMONARY PATIENTS. – School of Aviation Medicine, Randolph Field, Tex. May 1954. 10 p. (Project no. 21-40-002, Report no. 3). AD 51 608 UNCLASSIFIED

An analysis was made of the symptomatic reactions occurring during 1,777 air-evacuation patient flights of individuals with cardiac and pulmonary disorders. Symptoms occurred in 1% of patients listed under "cardiac disease"; among those with "pulmonary disorders, non-tubercular", 2.4% had symptoms related to the respiratory system; and among patients listed under "pulmonary tuberculosis and its complications", 2.7% showed mild or moderate symptoms related to their disorder. No deaths occurred and all flights were completed successfully. (School of Aviation Medicine abstract)

3509
Strickland, B. A.,
and C. Ferris
THE EFFECTS OF AIR TRANSPORTATION ON VARIOUS CLINICAL CONDITIONS: REACTIONS OF PSYCHIATRIC PATIENTS TO AIR TRANSPORTATION. – School of Aviation Medicine, Randolph Field, Tex. May 1954. 8 p. (Project no. 21-40-002, Report no. 4) AD 39 814 PB 115173

An analysis was made on 2,879 case reports of mentally disturbed, air-transported patients to determine what effects air transportation had on them. The psychiatric patients were divided into three groups: (A) locked ward patients who require restraint apparatus, special watch aboard aircraft and, at intermediate stops, are sedated, restrained, clothed in pajamas, and delivered to aircraft on a litter; (B) normally locked ward patients who do not usually require restraint apparatus but need special watch aboard aircraft and, at intermediate stops, are sedated, clothed in pajamas, and delivered to aircraft on a litter; and (C) patients who have records of causing no trouble (require no restraint or sedation). For purposes of this study, symptoms noted during flight were separated and attributed to physical or psychological factors. Of the case reports studied, 84.4% were without symptoms during flight, 4.5% had somatic symptoms, and 5.7% had mental or psychological symptoms. Results of the study on neuropsychiatric patients indicate that they can be advantageously and economically transported by air. No serious reactions occurred and no symptoms were reported which had untoward prognostic significance for the patients.

3510
Stroud, R. C. 1953
AMMONIUM CHLORIDE ACIDOSIS AND BREATH HOLDING. – Jour. Applied Physiol., 6(3): 151-153. Sept. 1953. DLC (QP1.J72, v.6)

The effects of reduced alkali reserve upon the maximum breath-holding time were studied in six subjects given 15 grams of ammonium chloride daily for three days. An average reduction of the alkali reserve of 20% was noted. The alveolar CO_2 differences between rest and after a maximum breath-holding effort were analyzed daily and found to be unaltered. These results are discussed in relation to high altitude acclimatization studies, which show a marked reduction in the alveolar CO_2 differences between rest and the breaking point; in both cases the expected reductions of the alkali reserve are similar.

3511
Stroud, R. C.,
and H. L. Conn
PULMONARY VASCULAR EFFECTS OF MODERATE AND SEVERE HYPOXIA IN THE DOG. — Amer. Jour. Physiol., 179 (1): 119-122. Oct. 1954.
DLC (QP1.A5, v. 179)

A study of the pulmonary circulatory effects of hypoxemia was undertaken in intact dogs, using a radioisotope dilution method for the determination of cardiac output. It was found that the breathing of either 5% O_2 in N_2 (arterial O_2 saturation = 46%) or of 10% O_2 in N_2 (arterial O_2 saturation = 79%) increased the resistance to blood flow through the lungs. The changes in the pulmonary pressure-flow relationships under these circumstances are interpreted as indicating vasoconstriction. Examination of the isotope dilution curves failed to reveal evidence for pulmonary arterial-venous shunting during hypoxia, and indicated a small but significant increase in pulmonary blood volume at both low oxygen levels. (Authors' summary, modified)

3512
Strughold, H. 1953
[LIFE ON MARS] Das Leben auf dem Mars. — Weltraumfahrt (Frankfurt), 4 (1): 24-26. Jan. 1953. In German.
DLC (TL789.W45, v. 4)

The discovery that the infrared spectrum of the green areas on Mars is similar to the spectrum of lower-order plants, e.g., lichens and mosses, renewed speculations about the possibility of life on Mars. The author assumes that the structure of all life in the universe is based on the carbon atom and its chemical properties. Maximal and minimal limits are imposed on life by environmental factors, particularly temperature, light, water, and the chemical composition of soil and atmosphere. The conditions on Mars are such that they fulfill at least all the minimum requirements of life with the exception of oxygen. The absence of the latter immediately excludes the presence of animal life, but would permit the development of lower-order plants, which release oxygen in the process of photosynthesis. In addition, a respiratory adaptive mechanism, as observed on earth, would permit the storage of oxygen in pores and labyrinths of air spaces. The hypothetical plant life on Mars would thus be active on the day side and regress to latency on the night side. Physiologically the combination of darkness and cold is more favorable to life in atmospheres lacking oxygen, because it permits the regression of all vital functions to a state of complete rest. Instead of oxygen, the presence of CO_2 becomes the first prerequisite for life on Mars. Although there is no atmospherical oxygen on Mars, an oxygen layer can be present within the vegetative substrate, fluctuating constantly with the shift of light around the planet.

3513
Strughold, H.
ATMOSPHERIC SPACE EQUIVALENT. — Jour. Aviation Med., 25 (4): 420-424. Aug. 1954.
DLC (TL555.A1A4, v. 25)

A review is presented of the technical and physiological conditions existing within earth's atmosphere, which are equivalent to those found in space. Static space equivalent conditions are those which occur at certain topographically fixed levels of the atmosphere: at 50,000 ft., oxygen pressure is insufficient for normal breathing; at 63,000 ft., body fluids begin to boil; at 80,000 ft., a sealed cabin, pressurized from within, is necessary due to the extreme rarification of the atmosphere and the presence of ozone; 120,000 ft. is the upper absorption limit for primary cosmic rays; 140,000 ft. is the space-equivalent altitude for the ultraviolet band of solar radiation. The darkness and silence of space are reached at about 400,000 ft.; here, too, meteors first encounter measurable

atmospheric resistance. A dynamic space equivalent condition is zero-gravity which is not associated with any specific height. This condition occurs when centrifugal force counterbalances the gravitational force of the earth. At an altitude of 120 miles, zero-gravity can be produced almost indefinitely, due to slight atmospheric drag. Man has flown where several, but not all, space conditions (partial space equivalence) are encountered. Unmanned rockets have flown deep into the region where conditions of the total space equivalence exist.

3514
Strughold, H.
HYPOXIA, HYPOXIDOSIS, HYPOXIDATION, HIBERNATION, APPARENT DEATH, AND SUSPENDED ANIMATION. – Jour. Aviation Med., 25 (2): 113-122. April 1954.
DLC (TL555.A1A4, v. 25)

A review of the terminology of oxygen deficiency is presented. Interest centers on biological oxidation. The term hypoxidosis has been applied to a disturbance of this process. Thus the emphasis is shifted from oxygen pathways (the lungs and blood) to the region of actual oxygen consumption in the cells. Hence a biological definition of oxygen deficiency is provided. The terms anoxia and hypoxia, on the other hand, are interpreted according to their literal, physical meaning: a decrease of oxygen tension in any medium. Hypoxidosis can be produced by a deficiency of any one of the three partners in biological oxidation: oxygen, cellular enzymes, or the food-stuff. A mere decrease in the level of biological oxidation, caused by lowered body temperature, is called hypoxidation as opposed to hypoxidosis. By discriminating between these two terms, the differences in high-altitude tolerance of various experimental animals can be readily explained. A particular case of of hypoxidation is hibernation (natural and artificial). Apparent death may be interpreted as an extreme case of hypoxidation. Suspended animation, observed in lower organisms subjected to temperatures approaching absolute zero, is the ultimate stage of hypoxidation. (Author's summary, modified)

3515
Strumza, M. V.,
and J. P. Guihery Le Rolland
[A TEST OF PHYSICAL FATIGUE] Un test de fatigue physique. – Médecine aéronautique (Paris), 9 (4): 493-495. 1954. In French.
DLC (TL555.M394, v. 9)

In order to develop an objective test of fatigue, physiological measurements were taken on 34 soldiers, ages 21-25 years, after 8 hours of sleep and again after a forced march of 25 km. over difficult terrain. The pulse rate of the rested soldiers, which had averaged 33.6 in 30 seconds, increased to 42.6 after the march; the systolic arterial pressures were 126.2 and 116.2 mm. Hg, respectively, and the diastolic pressures 81.9 and 78.3; respiratory vital capacity, 4.162 and 4.313 liters; pulse rate after voluntary apnea in forced expiration, 38.7 and 42.0 beats per 30 seconds; pulse rate 30 seconds after the apnea test, 36.5 and 36.8, respectively. The authors conclude that the best evidence of fatigue is derived from a comparison of the pulse rates before and 30 seconds after the apnea test: in rested subjects, there is a speeding up, in fatigued subjects a slowing of the pulse rate.

3516
Strydom, N. B.
SOME PHYSIOLOGICAL ASPECTS OF ADAPTATION TO HEAT. – South African Med. Jour. (Cape Town), 28 (6): 112-113. Feb. 1954.
DLC (R98.S63, v. 28)

The following physiological changes take place in acclimatization to hot humid environments: (1) increase in peripheral blood flow, (2) adjustments of blood pressure, (3) increase in blood volume, (4) slowing of pulse rate, (5) decrease in metabolic rate as

reflected in the gradual lowering of body temperature during work as well as during rest, and (6) adjustment of water and mineral exchange. The individual has to work during the process of acclimatization to become fully acclimatized for future work in hot environment. The acclimatization process has to be carried out until full acclimatization is achieved to temperatures that will be encountered in the future. The applied Physiology Laboratory of the Transvaal Chamber of Mines Research Laboratory has developed a new method of acclimatization for mine laborers, known as the Transvaal Chamber of Mines Two-Stage Method of Acclimatization. It is now in use and has proved to have considerable economical, physiological, and psychological advantages. Essentially, in the first stage the recruits work at a full production rate for 6 days in a cooler section of the mine, where the saturated air temperature does not exceed 87°F. This period is followed by 6 days of hard work in a hot but well ventilated section of the mine at a wet-bulb temperature of 91-92°F. Rectal temperatures are taken during the first two days in each stage. Certain factors, which may eliminate the acclimatization effect and render the acclimatized individual more prone to heat stroke, are: (1) conditions of ill health, (2) consumption of large amounts of alcohol, (3) excessive work rates, and (4) abnormally severe environmental conditions.

3517
Stubbs, R. A. 1953
DYNAMIC TRIALS OF ANTI-G VALVES. — Royal Canadian Air Force. Inst. of Aviation Medicine, Toronto. Report IAM no. 53/1, Feb. 6, 1953. 5+ 8p. AD 103 483 UNCLASSIFIED

Essentially the same as item no. 2150.

3518
Studnitz, G. von 1952
[THE IMPROVEMENT OF DUSK VISION THROUGH MEDICATION] Die medikamentöse Steigerung des Dämmerungssehens. — Naturwissenschaftliche Rundschau (Stuttgart), 5 (4): 156-157. April 1952.
DLC (Q3.N823, v. 5)

Improvements in both defective and normal night vision were observed after treatment with adaptinol (xanthophyll dipalmitate ester). In contrast to vitamin A, the improvements persist for a longer time after the discontinuation of treatment. Its action is explained by the fact that xanthophyll is present in great quantities in the choroid where in response to light and dark it undergoes changes similar to those of vitamin A.

3519
Stullken, D. E.,
and W. A. Hiestand
HEMATOLOGICAL CHANGES INFLUENCED BY SHORT AND LONG EXPOSURE TO COLD. — Proc. Soc. Exper. Biol. and Med., 86 (2): 253-255. June 1954. DLC (QP1.S8, v. 86)

Mice were exposed to cold (5°C.) for periods of 15 minutes and 5 days, and the effects on erythrocyte number, hemoglobin concentration, and blood sugar level determined. The short exposure (15 minutes) to cold caused a 15% drop in blood sugar, while no changes in blood sugar were observed after 5-day exposure to cold. The increase in blood sugar following short-time exposure is presumably due to a sympathetic effect resulting from cold stress and increased thermogenesis. Statistically this change had a P value of $< .001$. No significant adaptive changes to low temperature occurred in hemoglobin or erythrocyte number.

3520
Sulli, E. 1953
[AERIAL ASSISTANCE AND ITS FUNCTIONS IN PEACE AND WAR] Il soccorso aereo e le sue funzioni di pace e di guerra. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte

III: Comunicazioni, p. 523-526. In Italian, with English summary (p. 526).
DNLM (W3.CO943a)

A brief discussion is presented on the use of helicopters for rescue or first-aid purposes in times of war and in public disasters, or for the transport of physicians to inaccessible areas. Aerial evacuation of the wounded and the sick is discussed and a proposal is made for the organization of an Italian helicopter service.

3521
Sulli, E. 1953
[EFFECT OF RAPID FLIGHT ON THE CARDIOVASCULAR SYSTEM AND ON ITS IMPORTANCE IN THE GENESIS OF VASCULAR DISEASES] Influenza del volo veloce sul sistema cardiocircolatorio e sua importanza nelle genesi delle vasculopatie. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 517-522. In Italian, with English summary (p. 522).
DNLM (W3.CO943a)

A general discussion is presented on the factors which affect cardiovascular function in normal flight (including accelerations, anoxia, decompression, temperature, psychophysical stress), and during high speed flight (velocity, emotions). It is suggested that more importance be given to the selection of pilots for high speed flight utilizing medical examinations for diagnosing latent and functional minor cardiovascular disorders.

3522
Swartz, P.,
E. B. Norris, and S. D. S. Spragg
PERFORMANCE ON A FOLLOWING TRACKING TASK (MODIFIED SAM TWO-HAND COORDINATION TEST) AS A FUNCTION OF RADIUS OF CONTROL CRANKS. — Jour. Psychol., 37 (2): 163-171. April. 1954.
DLC (BF1.J67, v. 37)

The present study was designed to investigate the adequacy of performance of a two-hand tracking task (using the modified SAM Two-Hand Coordination Test) as a function of the radius of the control cranks. Forty subjects were used; each subject was given two trials on each of the following control crank radii: 1.0, 2.0, 3.0, 4.0, and 5.5 inches. Two combinations of control crank positions were employed. In Position I, both control cranks rotated in the vertical plane parallel to the frontal body plane. In Position IV, the right-hand control crank rotated in the vertical plane perpendicular to the frontal body plane, and the left-hand crank in the vertical plane parallel to the frontal body plane – i.e., as in Position I. Twenty of the subjects performed in Position I, the remaining 20 in Position IV. The results were analyzed in terms of mean time on target for each of the control radii within each position and for Position I vs. Position IV. Middle radii performances were found to be superior to performances involving the smallest and largest radii. Also, for every control radius used, performance was somewhat better when the tracking task was performed in Position IV than it was in Position I. It is concluded that for this and comparable two-hand tracking tasks the optimal magnitude of the control crank radius is of the order of two to three inches. (From the authors' summary)

3523
Syrotynin, M. M. 1953
[THE HIGH-MOUNTAIN EXPEDITION OF THE INSTITUTE OF CLINICAL PHYSIOLOGY OF THE ACADEMY OF SCIENCES OF THE UKRAINIAN SSR IN 1951] Pro vysokogirnu ekspedytsiiu instytutu klinichnoï fiziologiï AN U.S.S.R. u 1951 r. — Medychnyi zhurnal (Kiiv), 23 (2): 3-5, 1953. In Ukrainian.
DLC (R91.M426, v. 23)

At the height of 2000 meters members of the Mount Elbrus expedition experienced a state of excitement (stimulation) manifested as increased rate of movement of the hand and tendency to fast speaking. At the height of 4000 m. nearly all persons began to

suffer from mountain sickness, easy fatigability, headaches, sleepiness, and loss of appetite, and one test subject lost consciousness. In persons with poor altitude adaptability these symptoms were most marked, their pulse and respiration became irregular and the hemoglobin concentration was altered. After having reached the height of 4800 m., the expedition descended, which caused one of the participants to suffer changes in the higher nervous activity which, according to psychiatrist S. D. Pasïona, simulated hebephrenia. At 5300 m. such symptoms were of a graver nature, appeared more frequently, and were accompanied by more severe manifestations of mountain sickness. Examination of the same persons 5-7 days later showed signs of normalization, indicating a high degree of physiological acclimatization. No such changes in the physiological indices and in the higher nervous activity were observed among the staff members of the Mount Elbrus observatory who spent their winters on top of the mountain. The second signal system was profoundly affected at 4250 m. in persons with inadequate processes of acclimatization. Changes in the higher nervous activity at high altitudes accompanied by frank mountain sickness indicate that a way can be found to alleviate the condition by means of preventive psychiatry. At high altitudes there occur changes in respiration: it acquires a periodic character, especially in sleep, when the cortical functions are inhibited. During a later expedition some of the test subjects were administered sodium amytal as an inhibitor of the cortical function of the cerebrum; under normal conditions this has no effect on the respiratory system, but at a height of 2200 m. most of the tested individuals manifested a tendency towards periodic breathing.

3524
Szekeres, L.
[INFLUENCE OF HYPOXIA ON THE VAGUS- AND ACETYLCHOLINE-SENSITIVITY OF THE MAMMALIAN HEART] Einfluss von Hypoxie auf die Vagus- und Azetylcholinempfindlichkeit des Säugetierherzens. — Acta physiologica Academiae scientiarum hungaricae (Budapest), 6 (1): 109-112. 1954. In German.

DLC (QP1.M333, v. 6)

A series of experiments was carried out on hearts "in situ" of dogs and cats, and on rabbit hearts isolated by Langendorff's technique, to determine the effect of moderate hypoxia on the irritability of peripheral vagus branches (i.e. intracardial endings of the vagus) and on their sensitivity to acetylcholine. A mixed gas, consisting of 5-10% O_2 + 90-95% N_2 + 3% CO_2 was administered tracheally to the experimental animals and in nutritive solution to the isolated hearts. The findings show that electric irritation of the peripheral vagus branches increased inhibition of the heart slightly after hypoxia. Slow pulse rate caused by action of acetylcholine was decreased further if the acetylcholine dosage was administered after a period of hypoxia. After hypoxia even threshold dosages of acetylcholine led to considerable depression of the pulse frequency. Doses of strophanthin increased the cardio-inhibitory effect of the vagus only slightly in the normal heart. However, after a period of hypoxia or during hypoxia strophanthin greatly increased vagus irritability. Also, the inhibitory period was lengthened and persisted even after discontinuation of hypoxia. On the basis of these findings, it may be concluded that, in cardiac cases, hypoxia of the heart muscle affects vagus sensitivity. This explains why therapeutic doses of cardiac glucosides lower the pulse rate of cardiac patients, whereas toxic doses are necessary to produce bradycardia under normal conditions.

3525
Szekeres, L.,
J. Faller, and T. Török
[THE ENERGY-RICH PHOSPHORUS COMPOUNDS OF THE CARDIAC

MUSCLE DURING HYPOTHERMIA] Die energiereichen Phosphorverbindungen des Herzmuskels während der Hypothermie [Abstract].— Acta physiologica Academiae scientiarum hungaricae (Budapest), 6 (Supplement): 99-100. 1954. In German.

DLC (QP1.M333, v. 6)

This experiment was conducted to determine the effects of hypothermia, of hypoxia, and of several drugs used to suppress shivering on the creatine phosphate, adenosine polyphosphate, and glycogen content of the cardiac muscle in rats. In general, hypothermia intensified the action of the drugs which reduce the phosphorus compound content in the cardiac muscle. Anoxia in combination with hypothermia decreased the creatine phosphate level to 5.3 mg%, adenosine polyphosphate level 17.2 mg.%, and glycogen level 235 mg.%. When rats treated with Urethan were subjected to hypoxia (10.5% oxygen by volume for 1/2 hour), the creatine phosphate was reduced to 4.3 mg.%, adenosine polyphosphate was reduced to 21.1 mg.%, and glycogen was reduced to 264 mg.%. However, if hypothermic animals were subjected to the same hypoxic conditions, the level of energy-rich phosphorus compounds and glycogen decreased to a significantly lesser extent than in control animals subjected only to hypoxia. The following values were obtained: creatine phosphate 13.1 mg.%, adenosine polyphosphate 23.5 mg.%, and glycogen 346 mg.%. The authors conclude that hypothermia can reduce the decrease in energy-rich phosphorus compounds and in glycogen content of the cardiac muscle resulting from hypoxia.

3526

Szekeres, L.,
J. Faller, and F. Varga

[THE EFFECT OF O_2 DEFICIENCY AND CO_2 ON THE CONTRACTILITY AND IMPULSE FORMATION IN INDIVIDUAL REGIONS OF THE HEART] Wirkung von O_2-Mangel and CO_2 auf die Kontraktilität und Reizbildung einzelner Herzteile [Abstract].— Acta physiologica Academiae scientiarum hungaricae (Budapest), 5 (Supplement): 60-61. 1954. In German.

DLC (QP1.M333, v. 5)

The effect of hypoxia on the dynamics of the left and right ventricles was investigated using a heart-lung preparation of a dog. The depressive action of hypoxia affects the left ventricle earlier and to a far greater extent than the right ventricle; i.e., in the presence of unchanged pressure in the right auricle, the pressure in the left auricle is already considerably increased. At the same time, the work potential of the left ventricle is reduced far below that of the right ventricle. This difference in efficiency of both ventricles during hypoxia is striking: the left ventricle transports a barely increased blood volume against unchanged peripheral resistance, while the right ventricle conveys this minute volume against a greatly increased peripheral resistance. In order to investigate the action of CO_2 and hypoxia on auricular and ventricular impulse formation, the bundle of His was cut in cat and rabbit hearts isolated by Langendorff's technique. The changes in frequency in both parts were registered. Changes in auricular frequency are assumed to be due to changes in sensitivity threshold in the sinoauricular node, while changes in ventricular frequency are due to changes in the ventricular impulse formation. If Locke's solution or the blood bathing the heart is saturated with a mixture of oxygen and 5-50% CO_2, the formation of ventricular impulse takes place with a proportionally larger decrease in frequency than that of impulses in the sinoauricular node, as soon as the CO_2 content is 10% or over. This difference in frequency of auricular and ventricular impulses increases parallel to an increase of CO_2 in solution. The same phenomenon may be observed if a solution deficient in oxygen is used. (Translated in full and modified)

3527
Tabusse, L.,
O. Olsen, and J. Colin
[MODIFICATIONS OF VITAL CAPACITY DURING THE COURSE OF SOME TESTS OF HYPERVENTILATION] Modifications de la capacité vitale au cours de quelques épreuves d'hyperventilation. — Journal de physiologie (Paris), 46 (1): 531-536. 1954. In French. DNLM

Anoxemia of short duration induced by 8% or 10% O_2 in N_2 did not alter or cause a moderate lowering of the vital capacity in young military subjects. Intense and brief physical exercise caused intense hyperventilation, and after return to the normal state, an increase in vital capacity. Inhalation of CO_2-enriched air caused hyperventilation greater than that caused by anoxemia in most subjects, less than that produced by exercise, and also caused an increase of vital capacity. The mechanisms of action for explaining these variable results include peripheral phenomena such as the modification of pulmonary vasomotricity, alveolar expansion, action of the respiratory muscles, and perhaps, central phenomena such as a change of receptivity by the respiratory centers.

3528
Tabusse, L.,
J. Curveille, and O. Olsen
[MODIFICATIONS OF TOLERANCE TO ANOXEMIA BY CORTISONE] Modifications de la tolérance à l'anoxémie par la cortisone. — Comptes rendus de la Société de biologie (Paris), 148 (5-6): 567-569. March 1954. In French. DLC (QP1.S7, v. 148)

In 8 individuals of good health, ages 17 to 23, anoxemia was produced by inhaling a gas mixture containing 7.5% oxygen in nitrogen. Studied were both subjective and objective symptoms (especially encephalogram) as well as the time necessary to full recuperation. Tests were made before and 4 hours after administration of 200 mg. cortisone since smaller doses did not show any effect. Cortisone in fact increased the tolerance to anoxemia as well as reduced the recuperation time. This action is explained on the one hand by the already-known sensitizing effect of cortisone upon the cortex of the brain, on the other hand by its metabolic action, namely the increase of blood sugar, the normalization of the disturbed protein metabolism, and the blocking of the escape of certain cellular enzymes.

3529
Tabusse, L.
[MORPHINE AND ANOXEMIA] Morphine et anoxémia. — Médecine aéronautique (Paris), 9 (3): 301-304. 1954. In French. DLC (TL555.M394, v. 9)

Anoxia tolerance was determined in 8 young volunteers who had been given injections of 1 cg. of morphine. Anoxia was induced by inhalation of a gaseous mixture containing 7.5% oxygen in nitrogen at atmospheric pressure. Results are compared with previous experiments on the effects of morphine on dogs, after inducing a state of anxiety in the animals and elevating them to simulated altitudes up to 15,025 m. The author reaches the following conclusions: Morphine reduces anoxia tolerance in the healthy individual. It can produce vomiting in susceptible individuals. On the other hand, in subjects whose neuro-vegetative equilibrium is disturbed or who are suffering internal pains, the suppression of pain by morphine will increase anoxia tolerance. Therapeutic use of morphine may be indicated in flight patients suffering from illnesses causing persisting agony and agitation. (Author's conclusions, modified)

3530
Tabusse, L.
[THRESHOLD OF ORGANIC DISORDERS DURING INHALATION OF PURE O_2] Le seuil des perturbations organiques au cours de l'inhalation d'O_2 pur. — Médecine aéronautique (Paris), 9 (1): 80-81. 1954. In French. DLC (TL555.M394, v. 9)

Thirty young men inhaling oxygen for two hours at atmospheric pressure were divided into three groups. The first group inhaled pure oxygen, the second, 80% oxygen, and the third 60% oxygen. Pure oxygen and 80% oxygen caused the following physiological reactions: (1) decrease in respiratory rate and reduction in vital capacity in half of the cases; (2) initial hypoglobulia and subsequent return to normal corpuscular level within 24 hours; (3) decrease of pulse rate in the majority of cases; and (4) changes in the electrocardiogram. In some of the apparently normal subjects pathological reactions such as extrasystoles and drowsiness were detected. When 60% oxygen was inhaled, the physiological effects were similar, but no pathological reactions were observed. It is concluded that electrocardiographic recordings before and after inhalation of pure oxygen for one hour may provide a useful aviator selection test and may be used as a diagnostic test for certain heart diseases. Inhalation for more than one hour, however, cannot be practiced without risk of fatigue. When O_2 is inhaled for longer periods than one hour, the oxygen concentration should be less than 60%.

3531
Talner, N. S.,
J. Rizzolo, and H. W. Randel
OFFICER INDOCTRINATION IN PREVENTIVE MEDICINE. — U. S. Armed Forces Med. Jour., 5 (4): 583-588. April 1954. DLC (RC970.U7, v. 5)

While little indoctrination is required for civilian physicians entering the service and assigned to normal hospital duty, those assigned to field duty require considerable additional training. The course devised to indoctrinate Air Force officers at the Air Force School of Aviation Medicine, comprises four general areas of instruction: (1) military epidemiology; (2) environmental sanitation; (3) preventive medicine staff problems; and (4) preventive medicine record procedures. (See also item 2142, vol. 2)

3532
Tausch, R. 1953
[BINOCULAR SPACE PERCEPTION: A PROCESS BASED ON CORRESPONDENCE AND DISPARITY OF GESTALTEN RATHER THAN CORRESPONDENCE OR DISPARITY OF INDIVIDUAL RETINAL ELEMENTS] Die beidäugige Raumwahrnehmung—ein Prozess auf Grund der Korrespondenz und Disparation von Gestalten anstelle der Korrespondenz oder Disparation einzelner Netzhautelemente. — Zeitschrift für experimentelle und angewandte Psychologie (Göttingen), 1 (3): 394-421. 1953. In German, with English summary (p. 419-420). DNLM

The author brings experimental proof that binocular space perception does not result from the disparity and correspondence of stimulated retinal elements, but rather that the stimuli received by each eye are transformed into gestalten and that only the disparity and correspondence of these gestalten results in the activation of space perception. The fact that it is gestalten which find themselves in disparity first and not the retinal elements helps us to better understand some particularities of binocular space perception, e.g. that, within certain limits, there is no diminution of the visual depth acuity caused by anisometropia or by retinal incongruity and other defects which seriously affect the point-by-point cooperation of the retinal elements of both eyes. The importance of gestalt formation is stressed for optics, since a separation of sensation and form-conception or of sensation and perception does not seem to be in accordance with actual facts. (From the author's summary)

3533
Taylor, F. V.,
A. Kahn, and H. P. Birmingham
A DEMONSTRATION OF THE EFFECTS OF DISPLAY QUICKENING ON

MULTIPLE-COORDINATE TRACKING [Abstract]. — Amer. Psychologist, 9 (8): 481-482. Aug. 1954.
DLC (BF1.A55, v. 9)

A four-coordinate, compensatory, visual tracking task was provided through the use of an analogue computer. Six unpracticed Naval enlisted men were used as test subjects. Three cascaded integrators were inserted in each tracking loop. The subject manipulated two joy sticks to keep two target dots in view on a cathode ray tube; each dot was free to move in both X and Y coordinates. The success in performing this four-coordinate control task with a quickened display (Condition A) was compared with results when attempting to track in only one or two coordinates with no quickening (Conditions B and C). The three conditions were presented in random order to each subject for 10 days, four trials per condition. Each trial terminated at the end of two minutes. Scoring was in terms of length of time target was held. Results obtained were: (1) five of the six subjects tracked Condition A without loss of target from the second day on; (2) some learning occurred with Condition B but only one subject learned to control perfectly; and (3) no subject ever held the target throughout a trial with Condition C. The differences between conditions are statistically significant. It was concluded that display quickening increases markedly the number of control tasks that subjects can carry on concurrently. (Quoted in part)

3534
Taylor, H. L.,
A. Henschel, O. Mickelsen, and A. Keys
SOME EFFECTS OF ACUTE STARVATION WITH HARD WORK ON BODY WEIGHT, BODY FLUIDS, and METABOLISM. — Univ. of Minnesota. Lab. of Physiological Hygiene, Minneapolis (Contract AF 33(038)-21914); issued by School of Aviation Medicine, Randolph Field, Tex. March 1954. iii+9 p. (Project no. 21-32-004, Report no. 5).
AD 30 949-A UNCLASSIFIED

Healthy young men were starved 2.5 and 4.5 days, respectively, while performing physical work (treadmill) which resulted in a daily expenditure of 3,500 to 4,000 Cal. They lost 6.8% and 8% body weight, respectively. In the 4.5-day experiment the plasma volume decreased 18% and thiocyanate space 8%, the fluid loss accounting for 27% of the body weight loss of 5.5 kg. At the end of the 4.5-day fast, the mean 1-minute serum bilirubin had increased from 0.11 mg./100 cc. to 0.27 mg./100 cc.; urobilinogen also increased; in one case there developed malfunctioning of the liver. In the 2.5-day experiment, nitrogen loss was not affected by the physical work; acetone excretion began on the first day of starvation; resting blood sugar decreased, and the resting respiratory quotient was depressed. From comparison with literature data it is concluded that physical work in addition to starvation has little effect on the loss of body weight beyond the fourth day of fasting.

3535
Taylor, J. G. 1953
SYMPOSIUM ON THE ROLE OF STRESS IN MILITARY OPERATIONS 1 AND 2 MAY 1953 AT OPERATIONS RESEARCH OFFICE, CHEVY CHASE, MARYLAND. — Johns Hopkins Univ. Operations Research Office, Chevy Chase, Md. Project DOUGHBOY, Technical Memorandum no. ORO-T-256, Dec. 2, 1953. viii + 56 p. AD 34 311
UNCLASSIFIED

In its second symposium on fatigue and stress in military operations, the Operations Research Office presented the results of a field study conducted on the front lines of a battle zone in Korea. The meeting was attended by over one hundred scientists, representing the three military services and their branches, government agencies, and private institutions, who discussed the physiological and psychological

changes occurring in infantrymen as a result of combat, and the methods used for measuring these changes. (Author's abstract)

3536
Teichner, W. H., and M. J. Zigler 1953
A METHOD OF STUDYING THE TACTUAL-KINESTHETIC SENSITIVITY OF THE HAND. — Quartermaster Research and Development Center. Environmental Protection Division, Natick, Mass. Report no. 224, Nov. 1953. ii+11 p. AD 25 283 PB 122901

A method for determining the tactual-kinesthetic sensitivity of the hand was developed and evaluated. The apparatus consisted of eleven brass discs which the subjects discriminated by hand in terms of difference in size. Both frequency of the judgment, larger-smaller, and latency of the judgment were obtained with the method of paired-comparisons. Since the differences between discs were all suprathreshold, the former measure did not yield a sufficient number of errors to be useful for the construction of a psychophysical scale. The latency measure, however, yielded meaningful results showing that the method being investigated might be useful for making inferences regarding the effects of temperature and handwear on the complex tactual-kinesthetic sensitivity of the hand. (Authors' abstract)

3537
Teichner, W. H., and J. L. Kobrick
EFFECTS OF PROLONGED EXPOSURE TO LOW TEMPERATURE ON VISUAL PERFORMANCE, FLICKER FUSION, AND PAIN SENSITIVITY. — Quartermaster Research and Development Center. Environmental Protection Div., Natick, Mass. Report no. 230, June 1954. ii+13 p. AD 33 972 PB 122902

Five soldiers selected at random and clothed in under-garments lived in a constant-temperature chamber for the entire course of the experiment which consisted of 3 consecutive periods: a 16-day baseline period at 75°F, a 12-day cold period at 55°F., and a 13-day recovery period at 75°F. The data which were obtained allowed the following conclusions regarding the effects of prolonged exposure to low ambient temperatures (LAT): (1) LAT had no effect on the critical frequency of flicker fusion; (2) LAT increased the radiant-heat pain threshold; (3) the radiant-heat pain threshold did not recover normal sensitivity during low-temperature exposure; (4) visual-motor performance, which was markedly and immediately imparied in the cold, recovered gradually to a lower limit than it did under optimal temperature conditions; (5) the impairment of visual-motor performance in low temperature was the result of lowering of the final limit of performance rather than a reduction of the rate or limit of learning; and (6) under conditions of massed practice, temporary work decrement was not influenced by practice and was affected slightly or not at all by lowered ambient temperature. (AD abstract)

3538
Teichner, W. H., J. L. Kobrick, and R. F. Wehrkamp
EFFECTS OF TERRAIN AND OBSERVATION DISTANCE ON DEPTH DISCRIMINATION. — Quartermaster Research and Development Center. Environmental Protection Division, Natick, Mass. Report no. 228, May 1954. ii+23 p. AD 33 377 UNCLASSIFIED

A study was made to determine the effects of observation distance, type of terrain, and time of day on monocular and binocular depth discrimination. Experiments were performed over a macadamized airstrip and over sand, silt, and desert pavement. Analysis of the results showed that the linear threshold of the distance judgments increased exponentially with distance for both monocular and binocular viewing, the binocular conditions being

slightly superior until about 1900 ft. The data indicate that the angular threshold of transverse disparity can be markedly lowered in the presence of environmental, monocular factors. This threshold also decreases with observation distance. Further, the angular relationship between the observer and stimulus-surround markedly influences the accuracy of setting. The results indicate that, for terrains of the type reported, observations will be in error by an amount ranging between approximately 5 ft. at an observation distance of 200 ft. and approximately 100 ft. at an observation distance of 3000 ft. Significant differences were found among the thresholds obtained from the varying terrains used. Binocular vision under outdoor conditions is generally superior to monocular vision, although the differences are small and may not always be present. No differences between morning and afternoon observations were revealed. (AD abstract) (31 references)

3539
Teichner, W. H.
RECENT STUDIES OF SIMPLE REACTION TIME. — Psychol. Bull., 51 (2): 128-149. March 1954.
DLC (BF1.P75, v. 51)

Studies carried out during the past twenty years on simple reaction time (RT) (i.e. the time interval between the onset of a stimulus and the initiation of response under the condition that the subject has been instructed to respond to as rapidly as possible) are reviewed with particular regard to the influence of stimulus and receptor conditions, central and motor factors, and other special conditions. Of particular interest to aviation medicine are studies on RT with the subject in different body positions. During prolonged vigilance, RT increases proportionally to the period of vigilance. This decrement in RT is offset by benzedrine. In a study of the effects of radial acceleration on RT, both visual and auditory RT's increased with increased acceleration. Also, RT is increased at altitudes (anoxia) above 20,000 feet. However, increased variability of RT may be observed already at 2000 to 3000 feet. (163 references)

3540
Teichner, W. H.,
and R. F. Wehrkamp
VISUAL-MOTOR PERFORMANCE AS A FUNCTION OF SHORT-DURATION AMBIENT TEMPERATURE. — Jour. Exper. Psychol., 47 (6): 447-450. June 1954. DLC (BF1.J6, v. 47)

Time-on-Target measures on the pursuit rotor were obtained from four subject groups which practiced for short periods on five successive days under ambient temperatures of 55°, 70°, 85°, and 100°F, respectively. Performance was found to be poorer at temperatures above and below 70°F. This result confirms and extends previous studies of the effects of ambient temperature. In addition, the data suggest the possibility that the temperature function falls off more rapidly with temperatures lower than the maximum than it does for those that are higher. (Authors' summary)

3541
Telford, I. R.,
O. B. Wiswell, E. L. Smith, R. T. Clark, J. F. Tomashefski, and D. Criscuolo
PHYSIOLOGICAL EFFECTS OF EXPOSURE TO ALTITUDE AND OTHER ABNORMAL ENVIRONMENTS: THE PROPHYLACTIC VALUE OF TOCOPHEROL ON HYPOXIA. — Univ. of Texas Dental Branch, and Dept. of Physiology and Biophysics, Houston (Contract AF 41(607)39); issued by School of Aviation Medicine, Randolph Field, Tex. May 1954. 9 p. (Project no. 21-1201-0013, Report no. 4). AD 54 740 PB 115091

Rabbits which are subjected to periodic electrical stimulation and whose diets have been supplemented with large amounts of alpha-tocopherol

are more resistant to simulated altitude of 30,000 ft. for 7 hr. than are those fed normal diets. The normals, in turn, are more resistant than vitamin E-deficient animals. Study of the mechanism of these differences has given some evidence that the differences may be due to differences in cardiac reserve, or they may be due to differences in the metabolic needs of the tissues and the ability of the blood to take care of such needs. (Authors' conclusion)

3542
Terranova, S. 1953
[ON THE REACTIONS TO AMBIENT HYPERTHERMIA. VI. ELECTROCARDIOGRAPHIC AND BALLISTOCARDIOGRAPHIC FINDINGS] Sulle reazioni all'ipertermia ambientale. VI. Rilieni ECgrafici e ballistocardiografici. — Bolletino della Società italiana de biologia sperimentale (Napoli), 29 (8): 1558-1559. July-Aug. 1953. In Italian. DNLM

Electroencephalography in subjects exposed to heat (43°-45°C.) for two hours demonstrated a moderate and inconsistent increase in cardiac frequency. T wave modifications, related to potassemia, were also noted. Ballistocardiographic tracings in the same subjects revealed a constant reduction in the amplitude of systolic oscillations (H, I, J, K), which indicate reduced systolic activity caused by hyperthermia.

3543
Terzioğlu, M.,
and R. Aykut
VARIATIONS IN BASAL METABOLIC RATE AT 1.85 KM. ALTITUDE. — Jour. Applied Physiol., 7 (3): 329-332. Nov. 1954. DLC (QP1.J72, v. 7)

The basal metabolic rates of 12 experimental subjects (20-23 years of age) were determined at various periods during a sojourn of 12 days at 1.85 km. altitude at Uludağ, Turkey. These values were compared with those obtained at sea level at Istanbul prior to ascent and following the descent from mid-altitude. The basal metabolic rate of each subject was expressed both as Cal./24 hr. and Cal/m^2/hr. Both values were definitely increased on the 5th to the 6th day of the sojourn at Uludağ and remained at practically the same level during the remainder of the experimental period on the mountain.

On return to sea level, the basal metabolic rate was reduced to normal in all subjects within various periods of time following the descent from mid-altitude. The mean respiratory quotient (R.Q.) value was diminished from an initial of 0.92 to 0.84-0.85 during the sojourn at mid-altitude. On return to sea level, R.Q. was again increased to normal. The respiratory minute volume showed tendency to be increased during the second experimental period (5th to 6th day) at Uludağ. On further residence, however, it was somewhat diminished. On return to sea level, respiratory minute volumes still remained high in a few of the subjects, though the corresponding basal metabolic rates were reduced to the initial values at Istanbul. It is thought that the increase in metabolic rate may be attributed to a general stimulating effect on the organism by the relative lack of oxygen in the tissues. (Authors' summary, modified)

3544
Terzioğlu, M.,
and N. Tuna
VARIATIONS IN BLOOD VOLUME AT 1.85 KM ALTITUDE. — Jour. Applied Physiol., 6 (7): 417-422. Jan. 1954. DLC (QP1.J72, v. 6)

To investigate the hematological variations at mid-altitude, blood volumes of seven experimental subjects (21-29 yr. of age) were determined before, twice during, and after a 10-day sojourn at Uludağ, Turkey (1850 m). The plasma volume remained practically unchanged during the period at mid-altitude. Nine to ten days after descent to sea level, the plasma volume increased to 6.9% over the initial

value indicating a hemodilution. Total blood volume had increased 7.5% by the end of the 10-day period at mid-altitude. Since this increase occurred at about the same time as other hematological variations previously observed, and since it was mainly due to an increase in total cell volume, there can be no doubt of the occurrence of a true hematopoiesis at mid-altitude. Nine to ten days after the return to sea level, the total blood volume was greater than the pre-expedition value, but less than the final mid-altitude value. This relatively high blood volume resulted chiefly from the increase in plasma volume, since the total cell volume was practically normal. By the end of the 10-day period at mid-altitude, the total amount of hemoglobin was 10.2% above pre-expedition values, and the total cell volume was 17.8% above them. On return to sea level, the total amount of circulating hemoglobin remained at mid-altitude values, while the cell volume decreased. (Authors' summary)

3545
Terzioğlu, M.,
F. Özer, and N. Gökhan
VARIATIONS IN GASEOUS CONTENT AND ACID-BASE EQUILIBRIUM OF ARTERIAL BLOOD AT 1.85 KM. ALTITUDE. — Jour. Applied Physiol., 6 (7): 423-428. Jan. 1954.
DLC (QP1.J72, v. 6)

Oxygen and CO_2 contents, O_2 capacity, pH, alkali reserve, and lactic acid content of arterial blood in seven healthy male subjects (21-29 yr. old) were determined during a sojourn of 10 days at Uludağ, Turkey (1850 m). These values are compared with those obtained at sea level prior to ascent and following descent from the mountain. From the values for O_2 content and O_2 capacity, percentage O_2 saturation was computed and from those for O_2 capacity, hemoglobin concentration. O_2 capacity increased 10.1% over sea level value by the end of the expedition to Uludağ. Hemoglobin concentration increased about the same magnitude. The mean percentage O_2 saturation in arterial blood was diminished about 3% below the sea level average during both data collection periods at Uludağ. From the O_2 dissociation curve of Bock et al., this diminution corresponded to a reduction of about 24 mm. Hg in pO_2. This finding as well as the augmented lactic acid content at mid-altitude was interpreted as indicating a state of partial anoxia in the tissues and as offering sufficient evidence of an accelerating effect on erythropoiesis by H-ions accumulated in the bone marrow. The increase in lactic acid content also partially explained the diminution in alkali reserve in both venous and arterial blood. This reduction in alkali reserve was accompanied by a decrease in CO_2 content, while the pH remained constant. On return to sea level, O_2 content, O_2 capacity and hemoglobin concentration were diminished, while the alkali reserve and CO_2 contents were increased, though not to the initial values obtained at Istanbul. The percentage O_2 saturation was practically the same as the initial value at Istanbul. (From the authors' summary)

3546
Thavaravej, T.
THE TWO MILLIONTH AIR EVACUEE. — Royal Thai Air Force Med. Gaz. (Bangkok), 3 (3): 239-245. June 1954. In Thai and English. DNLM

This is an account of the air evacuation of the two millionth patient in the history of U.S. military aviation on February 25, 1954. The patient was Air Force S/Sgt. W. F. MacDonnell, a B-29 aerial gunner and observer, who was injured in an aircraft accident at Komaki Air installation near Nagoya in December 1953. He sustained fractures of both legs, 30% scattered burns on his body, and minor head injuries. He was returned to a military hospital in New York for additional treatment. A short review of the advances in medical air evacuation techniques is added.

3547

Thiele, O.

[CHANGES IN PLASMALOGEN IN STRESS SITUATIONS] Über das Verhalten des Plasmalogens in Stresssituationen. — Zeitschrift für die gesamte experimentelle Medizin (Berlin), 123 (1): 65-70. 1954. In German.

DNLM

Intensive stress stimuli, such as X-rays, scalding, and injection of N-Lost (trichlorotriethylamine) caused a significant increase in the plasmalogen level of blood serum in rats. For control of the stress effect, histological studies of adrenal cortex were done. Cold stress in a refrigerated chamber and histamine injections did not affect the serum plasmalogen content. The histological studies of the adrenal cortex did not reveal any significant changes as a result of these stresses. An evaluation of the total plasmogen content of rats proved that plasmalogen neogenesis appears in extreme stresses. (Author's summary, translated and modified)

3548

Thistlethwaite, D.,
H. Moltz, J. Komenetzky, and H. de Haan

EFFECTS OF BASIC TRAINING ON LEARNING BY AIRMEN OF DIFFERENT INTELLECTUAL ABILITY. — Univ. of Illinois, Urbana (Contract AF 33(038)-25726); issued by Air Force Personnel and Training Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. [Technical Report no. AFPTRC-TR-54-14], March 15, 1954. v + 9 p. (Project no. 503-001-0009). AD-39 974 UNCLASSIFIED

An attempt was made to determine (1) the changes that occur in the knowledge of airmen as a result of basic training; (2) the relationship between intelligence and the level of information which airmen possess at the beginning of basic training; (3) the relationship between intelligence and achievement during the basic training course. The experimental group consisted of 933 subjects who took a battery of information tests and attitude scales both at the beginning and the end of basic training. The control group consisted of 96 subjects who were excused from the initial testing session. The battery of measures for assessing effects covered 11 content areas. These include (1) AF history, organization, and traditions; (2) AF career fields; (3) military customs and courtesies; (4) military drill and ceremonies; (5) military law; (6) military clothing and equipment; (7) first aid; (8) nomenclature, operation, and use of the carbine; (9) AW, BW, and CW; (10) privileges and benefits of military service; and (11) United States citizenship. Completion of basic training was associated with significant increases in information in 9 of 11 content areas. Intelligence correlated positively with initial level of information in each of the subject matters examined. Men high in intellectual ability learned significantly more than men low in intellectual ability in most, if not all, of the content areas examined. (AD abstract)

3549

Thorn, W.,
and R. Heitmann

[pH of CEREBRAL CORTEX IN SITU IN RABBITS UNDER CONDITIONS OF PERACUTE AND TOTAL ISCHEMIA, ANOXIC ANOXIA, AND DURING RECOVERY] pH der Gehirnrinde vom Kaninchen in situ während perakuter, totaler Ischämie, reiner Anoxie und in der Erholung. — Pflügers Archiv für die gesamte Physiologie (Berlin), 258 (6): 501-509. 1954. In German.

DLC (QP1.A63, v. 258)

Glass electrodes were used to measure pH values of the exposed cerebral cortical surface in rabbits under conditions of (1) Urethan narcosis, (2) experimentally induced anoxia, and (3) peracute ischemia and subsequent recovery. Considerable and abrupt decreases in pH were observed in the case of ischemia. Maximum acidity was reached approximately 10 sec. after

termination of ischemic conditions. When recovery set in, there was a rapid rise of pH for a few minutes. Later on, the rise leveled down until normal values were re-established. During anoxia, changes in pH were found to be slight in comparison to ischemia. For both, anoxia and ischemia, the experimental-time-to-recovery-time ratio was 1:20 to 1:25. Formation of lactic acid is regarded by the authors as the cause for the pH changes in anoxia, while the more extensive changes of pH in ischemia may be attributed to the additive effect of lactic acid and CO_2. (Authors' summary, modified)

3550
Timmons, D. E., 1952
R. B. Mitchell, and D. T. Anderson
STUDIES ON MICROORGANISMS OF THE UPPER ATMOSPHERE. VI. THE INFLUENCE OF ALTITUDINAL AND SEASONAL FACTORS ON AIR-BORNE MICROORGANISMS. — School of Aviation Medicine, Randolph Field, Tex. July 1952. iii + 11 p. (Project no. 21-35-001, Report no. 6).
UNCLASSIFIED

Viable air-borne microorganisms were collected quantitatively and qualitatively at true altitudes up to 32,300 feet. The number of air-borne microorganisms in a space volume of 1,000 liters varied from 700 at an altitude of 2,000 feet to 25 at an altitude of 32,300 feet on May 17, 1951. The number of normally occurring air-borne microorganisms in the same space volume, at the same altitude, over the same geographic location changes considerably during the different seasons of the year. Peaks of micropopulation were observed in the spring and again in the fall. Total micropopulation counts in a space volume of 1,000 liters obtained at a true altitude of 2,000 feet over the same geographic location varied between 75 and 1,125 during the period of May 9 to December 12, 1951. (From the authors' summary and conclusions)

3551
Tkachenko, I.
[PARACHUTE JUMPING IN THE WINTER] Pryzhek s parashûtom zimoĭ. — Kryl'ia rodiny (Moskva), 5 (11): 7-8. 1954. In Russian.
DLC (TL504.V683, v. 5)

If parachute jumping is to be practiced in winter, proper precautions must be taken to prevent the accumulation of moisture in the parachutes, particularly at low temperatures, which may cause the accumulated moisture to freeze and to interfere with the proper serviceability of the automatic equipment and of the oxygen apparatus. Generally speaking, the preparation of airplanes for winter parachuting differs little, if at all, from preparation for summer parachute jumping, except to see that rubber-made articles, such as mats, etc., are well protected against stiffening and other deterioration by cold or freezing. The oxygen masks must be made of fur and they must not be removed from the fixed position until the parachutists descend to the ground. Particular attention is called to the manner and caution required in landing on frozen soil, especially in the absence of snow. After landing it is frequently necessary to manipulate the domed parachute into the proper position before it is dragged along, which is a tiring task even under normal conditions, and especially so when the snow is heavy on the ground. Therefore, parties must be in readiness to adequately meet such emergencies and to assist in the proper manipulation and carrying of the parachute. Under certain conditions such auxiliary parties may have to be equipped with skis. Other important points are briefly outlined.

3552
Toerpe, R. T.,
and G. A. Hardman
WE EJECTED FROM THE STRATOJET. — Combat Crew, 5 (3): 4-8. Sept. 1954. DLC

The authors' experience in ejection under emergency conditions from a B-47 Stratojet, the first such case, is related. Both men suffered injuries, and there were minor malfunctions of procedure, causing, for instance, the loss of first-aid kits. Although equipment functioned effectively, and the men involved were adequately trained in the operation of the ejection apparatus, it was felt that further training was necessary in procedural matters such as the sequence of the crew's ejection.

3553
Tolhurst, G. C.,
and R. W. Peters
THE EFFECT OF ATTENUATING ONE CHANNEL OF A DICHOTIC CIRCUIT UPON THE WORD RECEPTION OF DUAL MESSAGES. — Ohio State Univ. Research Foundation, Columbus (Contract N6ONR 22525); and Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 36, Dec. 1, 1954. ii + 16 p. (Project no. NM 001 064.01.36). AD 62 321 PB 117618

Listeners responded to two simultaneous messages through dichotic headset circuits. The simultaneous messages were word groupings from the multiple-choice intelligibility tests. The signal level of one of the messages remained constant. The level of the other messages was attenuated in five steps of three decibels each step. The variable under study was the effect of these attenuation levels upon the reception of the two messages. Messages were received under conditions of noise and quiet. The general effect of attenuating one simultaneous message was that of decreasing the reception of the attenuated message and increasing the reception of the unattenuated message. The effect was more pronounced in noise than in quiet. (Authors' abstract)

3554
Tolhurst, G. C.
THE EFFECT ON INTELLIGIBILITY SCORES OF SPECIFIC INSTRUCTIONS REGARDING TALKING. — Ohio State Univ. Research Foundation, Columbus (Contract N6ONR 22525); and Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 35, Nov. 30, 1954. 6 p. (Project no. NM 001 064.01.35). AD 51 810 PB 118713

Three short single instructions were given to Naval flight students, who spoke under conditions of an air acoustic channel, to determine if the instructions would be reflected in intelligibility changes. The intelligibility scores of speakers were raised as they followed any one of three instructions, "talk loudly", "articulate precisely", and "talk fast". Although these instructions may seem to pertain directly to different primary accompaniments of intelligibility, each instruction may have raised the sound pressure level of speech, or modified the speaker's verbal manner by some interaction of intelligibility factors. (Author's summary)

3555
Tolhurst, G. C.
SPEECH RECEPTION AND TEMPORARY HEARING LOSS AS A FUNCTION OF EXPOSURE TO HIGH-LEVEL NOISE. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr 22525); and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 064.01.32). Joint Project no. 32, Oct. 30, 1954. 42 p. AD 51 868 PB 116579

Pulse hearing test scores and multiple-choice word reception scores were obtained from 1,402 naval flight students in groups of approximately 18 per group as they experienced two hours of high-level noise. Each experimental session was divided into three time patterns of noise broken by one-minute periods of quiet. The word reception scores were obtained during the noise intervals and the pulse test scores during the quiet periods. — The results indicate that: (1) Increases in the noise level affected adversely

word reception scores, especially under conditions of "shaped" noise spectra. (2) Changes in the spectrum of the "shaped" noise, the overall noise level being held constant, affected word reception scores. Changes in the octave-band noise, from one octave to another, did not. (3) Accumulative effects of time-in-noise over a two-hour period did not seem to affect word reception. (4) Significant differences were found between pre-exposure pulse hearing test scores and post-exposure scores. No accumulative effects due to time-in-noise were found for the two-hour experimentation time. (5) For octave-band noise levels of 110 and 115 db., changes in the spectrum were reflected by changes in pulse test scores. (6) Changes in noise level of any type of spectrum used in this study did not significantly affect the pulse test threshold shift found in pre-exposure and post-exposure tests. (From the author's summary)

3556
Tolhurst, G. C.
VARIABLES OF ENVIRONMENT AND PRINTED MATERIALS IN INTELLIGIBILITY TESTING. — Ohio State Univ. Research Foundation, Columbus (Contract N6ONR 22525); and Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 38, Dec. 30, 1954. iii + 10 p. (Project no. NM 001 064.01.38). AD 62 323 PB 117617

Listeners and speakers in administrations of the multiple-choice intelligibility tests were exposed to comparing noises of two different spectra but of similar level. The noise recorded at the copilot's position in a twin-engine aircraft produced more masking to speaker intelligibility than the noise that simulated a single-engine spectrum. Recordings of nine-member teams reading a form of the multiple-choice intelligibility tests in counterbalanced rotational order did not yield different intelligibility scores. Regular cross-out response forms prepared for the multiple-choice intelligibility tests yielded higher scores than did forms prepared for IBM scoring. Listener variability was the same under both circumstances. (Author's abstract)

3557
Tolhurst, G. C.,
and J. W. Black
VOCAL RESPONSES BEFORE MICROPHONES. — Ohio State Univ. Research Foundation, Columbus (Contract N6ONR-22525); and Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 24, July 15, 1954. 3 p. (Project no. NM 001 064.01. 24). AD 41 469 PB 115728

Tests were conducted to determine (1) if the presence of a microphone affects the sound-pressure level of speech, (2) if the presence of a microphone affects the intelligibility of the speaker, and (3) if the position of a microphone affects the sound-pressure level of a speaker. Thirty-two male subjects talking naturally read phrases to an experimenter and into a microphone; both were at controlled distances from the reader. Results indicated that the speakers altered their sound-pressure level in keeping with the 4- and 8-ft. experimental separation distances between themselves and the listener or the microphone. Speakers spoke with greater sound-pressure level into a microphone than to a listener. (AD abstract)

3558
Topolnik, Z.,
and B. Milojević
[EAR PLUGS AS PROTECTION AGAINST NOISE] Ušni čepovi kao zaštitno sredstvo protiv buke. — Arhiv za higijenu rada (Zagreb), 5 (1): 105-112. In Croatian. DLC (RA421.A69, v. 5)

Acoustic trauma caused by exposure to high-intensity noise in industrial plants is discussed and illustrated in audiograms. The author recommends the use of ear plugs for the protection of workers and analyzes the acoustical properties of several kinds of ear plugs with regard to speech communication and attenuation of various noise fre-

quency bands. The use of ear plugs frequently reduces hearing loss already incurred by previous exposure to noise.

3559
Torrance, E. P.
PSYCHOLOGICAL ASPECTS OF SURVIVAL: A STUDY OF SURVIVAL BEHAVIOR. — Human Factors Operations Research Labs., Bolling Air Force Base, D.C. HFORL Memorandum no. TN-54-4, Jan. 1954. vii+93 p. AD 49 626 PB 117038

This report consists of a series of non-technical discussions on the psychological aspects of survival. It is the result of studies of the survival experiences of hundreds of Air Force personnel downed during World War II and the Korean combat. The discussion in Chapter I is concerned with the problems of fear in survival. The second chapter deals in a similar manner with psychological reactions to pain, cold, hunger, fatigue, boredom and loneliness under survival conditions. The third chapter is concerned with various aspects of group behavior under survival conditions. In the following chapter an attempt has been made to deal with the personality requirements for survival. The fifth chapter presents an analysis of the psychological principles involved in the relationships of downed Air Force personnel with individuals and groups in enemy territory. In the sixth, the psychological concept of "set" is examined for its meaning for survival and for Air Force training. Survival experiences are then examined in relationship to the concept of "set" to discover more fully its meaning for survival. In the seventh, a similar approach is followed in relation to the important concept of conflict as it relates to survival and survival training. (From the author's preface)

3560
Torrance, E. P.
PSYCHOLOGICAL ASPECTS OF SURVIVAL, SUPPLEMENT: TEACHING THE PSYCHOLOGICAL ASPECTS OF SURVIVAL. — Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memorandum Report no. TN-54-4A, Jan. 1954. 25 p. AD 53 980 PB 117037

The following aspects of survival indoctrination are discussed:
Teaching to control fear and panic
Psychological reactions to pain, cold, thirst, hunger, fatigue, boredom, and loneliness
Teaching for effective group action in survival
Personality requirements for survival
Learning how to get along with friend and foe in hostile territory
Teaching "set" for survival
Teaching how to resolve conflicts in survival
Teaching the dangers of making concessions to comfort
(AD abstract, modified)

3561
Towner, A. A.,
and G. W. Powell
THE MEDICAL SERVICE IN A COMBAT AIR FORCE. — Jour. Aviation Med., 25 (2): 128-155. April 1954. DLC (TL555.A1A4, v. 25)

The medical service of the U. S. Eighth Air Force is discussed with a view to the peculiar medical, psychological, logistic, and training problems encountered in this combat unit. These are: (1) tensions associated with constant combat readiness; (2) the high altitude conditions under which combat would occur; (3) the extreme distances to be flown; (4) a highly competitive personnel rating system; (5) the crews must be the most highly trained in the air force; (6) because of the vast experience required, pilots are necessarily older. In order to operate successfully under the above conditions, the crew personnel must trust the flight surgeon. In addition, flight surgeons must be highly motivated by, and indoctrinated in, the methods and aims of the command. Collected data must be expedited, and communication between unit flight surgeons and headquarters

must be simple and fast. This program which has been instituted in the Eighth Air Force, and which applies the principles of aviation medicine to problems associated with flight, has resulted in the production and maintenance of a combat ready air command.

3562
Townsend, J. C.,
and H. E. Bamford
EVALUATION OF ATTITUDE-INSTRUMENT-FLYING PROFICIENCY BASED ON PERFORMANCE IN A FLIGHT SIMULATOR [Abstract]. — Amer. Psychologist, 9 (8): 483. Aug. 1954. DLC (BF1.A55, v. 9)

It was the purpose of this paper to determine whether a student's attitude-instrument-flying proficiency may be evaluated in a flight simulator. The subjects were 32 student officers in the USAF Primary Pilot Training Program, all of whom had received 20 hours of instruction in attitude-instrument flying. Each subject received one flight in each of two T-6 aircraft and one "flight" in each of two SNJ (T-6) electronic flight simulators. Performance was recorded by check pilots in objective-type flight check booklets. A number of subjective-type ratings of the student's performance were also assigned during each check. The design of the experiment precluded any systematic effect of check pilots, apparatus, weather, or order of conditions. It was found that estimated true-score correlation between flight and simulated flight performance is unity when based on an objective-type score and .93 when based on subjective-type ratings. Validity of observed performance in simulated flight as a predictor of true performance in actual flight is estimated at .56 for the objective-type score, and .39 for the subjective-type ratings. There is an indication that a pilot's attitude-instrument-flying proficiency may be evaluated on the basis of his performance in a flight simulator as adequately as on the basis of his performance in an airplane. (Quoted in part)

3563
Trambitskiĭ, G. S.
NOISE AND THE MEANS OF COMBATTING IT. — Defence Research Board (Canada). Defence Scientific Information Service, Ottawa. Report no. T 77 R, Feb. 3, 1954. 30 p. AD 26 025 UNCLASSIFIED

This is an English translation, by E. R. Hope, of an article, published in Russian, in Zhurnal ushnykh, nosovykh i gorlovykh bolezneĭ, 15: 247-260. 1938.

The literature dealing with the topic of industrial noise, its physiological, and pathological effects, and their prevention is briefly reviewed. A theory is advanced which attributes the effects of noise to fatigue phenomena, which may account for the allegation that flyers exposed to noises up to 115 decibels do not suffer permanent deafness if they take intermittent rest periods between flights. Experiments have revealed the detrimental effect of noise with regard to output, productivity, and precision of a worker. Some authors consider a noise as low as 50 decibels as the limit of safety. Two noise sources operating in conjunction do not yield a noise intensity equal to the sum of the two; to reduce noise it is sufficient to reduce the predominant noise alone. A bibliography comprising 103 references from Russian sources, as well as 114 references from British, American, German, and French sources is attached.

3564
Treon, J. F.,
F. P. Cleveland, and J. Cappel
THE TOXICITY OF CERTAIN LUBRICANTS, ENGINE OILS, AND CERTAIN OF THEIR CONSTITUENTS, WITH PARTICULAR REFERENCE TO THE PRODUCTS OF THEIR THERMAL DECOMPOSITION. — Univ. of Cincinnati. Kettering Lab., Ohio. (Contract AF 33(038) 26456); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force

Base, Ohio. WADC Technical Report no. 54-344, Nov. 1954. x + 83 p. (RDO no. 698-31). AD 62 764 PB 122187

Di-2-ethylhexyl sebacate, di-sec-amyl sebacate, di-2-ethylhexyl adipate, and formulations WS-2211 and PRL-3313, when given undiluted in a single oral dose to animals are either slightly toxic or practically non-toxic. The esters and formulations WS-2211 and PRL-3039 when maintained in contact with either the intact or abraded skin of rabbits for 24 hours are practically non-toxic. Repeated applications of large doses of WS-2211 upon the skin of rabbits resulted in irritation. High concentrations of the mists of these substances were generally tolerated without untoward reactions. The highest tolerable dosage and the lowest lethal dosage for one or more species of animals exposed to fog of the thermal decomposition products formed from these materials at 700°F. have been established and are expressed in terms of milligrams of the substance delivered into the Inconel furnace per liter of air passing through it. (Authors' abstract)

3565
Trites, D. K.
PSYCHIATRIC SCREENING OF FLYING PERSONNEL: RESEARCH ON THE PERSONAL INVENTORY TEST. — School of Aviation Medicine, Randolph Field, Tex. Nov. 1954. 13 p. (Project no. 21-0202-0007, Report no. 8). AD 69 411 PB 117163

The Personal Inventory is a forced-choice test composed of 20 pairs of statements. Item analysis indicated 12 of the pairs discriminated between 46 satisfactorily adjusted and 46 unsatisfactorily adjusted aviation cadets. Validation of this 12-item scoring key produced biserial validity coefficents ranging from .21 to .40, depending on the characteristics of the criterion groups used. Application of a cutting score to the score distribution of all cases, except the Experimental Sample, screened 13 percent of the total group. Seventy-two percent of these were identified correctly as failures. These findings indicate that the test will probably be useful in a battery of psychiatric screening devices. (Author's abstract)

3566
Troisi, F. M. 1952
N. Pizzarini, and C. Urbini
[COLD IN THE WORKING ENVIRONMENT] Il freddo nell' ambiente di lavoro. — Medicina del lavoro (Milano), 43 (6-7): 266-271. June-July 1952. In Italian. DNLM

Case histories were recorded of 66 laborers who, in the course of their work, had been exposed extensively and intermittently to low temperatures (0-2° C.), at a humidity considerably below the dew point. A great number of workers were found to suffer from chronic pains of muscles and joints. Acute rheumatism, however, was found only in a small and insignificant percentage of individuals. The same applied to incidences of pneumonia and broncho-pneumonia. Sphygmomanometric examinations revealed maximum arterial blood pressures of 100-110 mm. in 14% of the workers, while in 10% of the cases maximum arterial blood pressure did not exceed 120 mm. Clinical examinations, as well as personal interviews, gave evidence to the fact that individuals exposed to low temperatures for an extensive time acclimatized remarkably to the cold environment.

3567
Trowbridge, B. C. 1953
AERO-OTITIS: ETIOLOGIC AND THERAPEUTIC CONSIDERATIONS. — Eye Ear Nose and Throat Monthly 32 (9): 500-505. Sept. 1953. DNLM

Aero-otitis results from a combination of faulty eustachian tube function and exposure to rapidly increasing atmospheric pressure. The principal pathologic alteration is the accumulation of sterile fluid in the middle ear cavity. The aspiration of tympanic fluids by double pinpoint perforation is the

most effective method of relieving the symptoms of aero-otitis and shortening the period of convalescence. This process prevents the adhesive fluid effects which might result in permanent impairment of hearing. Radium therapy to the nasopharynx is the treatment of choice for recurrent aero-otitis. Air travel is to be discouraged when the normal functioning of the eustachian tubes is impaired. (Author's summary, modified)

3568
Trumbull, R.,
R. S. Melton, and E. P. Hollander
CHANGES IN PERSONALITY CHARACTERISTICS OF NAVAL AVIATION CADETS: I. INDOCTRINATION WEEK TO COMPLETION OF PRE-FLIGHT. — Naval School of Aviation Medicine, Pensacola, Fla. Research Report, May 14, 1954, 7 + 4 p. (Project Report no. NM 001 058.26.01). AD 41 470
UNCLASSIFIED

The present study is a preliminary one aimed at estimating the amount and nature of personality modifications that take place during the four months of pre-flight. The Guilford-Martin series of tests were used, and a group of 316 Naval Cadets constituted the sample. Significant changes were observed on three traits — Ag (agreeableness), T (thinking introversion-extroversion) and G (general pressure for overt activity). In addition, there was a marked increase in the use of the question mark (undecided) response. These changes and their implications were given tentative explanations. (From the authors' summary)

3569
Tuba, J.,
and O. Forcher-Mayr
[STUDIES REGARDING CONTROL AND PROMOTION OF ALTITUDE TRAINING AT OBERGURGL] Untersuchungen zur Kontrolle und Förderung des Höhentrainings in Obergurgl. — Wiener klinische Wochenschrift (Wien), 66: 919-921. Dec. 1954. In German.
DNLM

Comparative studies on unacclimatized trained and untrained subjects and acclimatized natives were undertaken at the Obergurgl alpine research station (2000 m.) for the medical control and promotion of mountain training. It was shown that athletic proteinuria was frequently encountered in trained but unacclimatized subjects after exertion, but not in the morning. An increased morning urobilinogenuria and proteinuria was observed in a significant number of untrained and unacclimatized subjects. It was concluded that athletic albuminuria unaccompanied by an increase in the total lymphocyte count may be explained not only by lack of physical training or exertion, but also by insufficient acclimatization to altitude, as substantiated by frequent albuminuria in physical education students. A comparison of diurnal variations in the leukocyte-lymphocyte profiles showed a significant evening rise in the unacclimatized subjects. The lymphocyte-leukocyte count remains on the same but slightly higher level in the acclimatized natives. Choline citrate and calcium citrate supplement to diet, tested in connection with research on acceleration of acclimatization to altitude, in the doses used lowered the diastolic blood pressure through peripheral vasodilatation.

3570
Tucker, L. R.
A RATIONAL CURVE RELATING LENGTH OF REST PERIOD AND LENGTH OF SUBSEQUENT WORK PERIOD FOR AN ERGOGRAPHIC EXPERIMENT. — Princeton Univ., N. J. March 1954. 1+14+5 p. (Contract N6onr-270-20). (In cooperation with Educational Testing Service, Princeton, N. J.). AD 42 985 PB 116391

After an individual has performed a constant, repetitive, motor task to the point of exhaustion, a rest period will enable him to repeat the task for another work period before again being unable to continue. A graph relating the length of the rest period to the

length of the subsequent work period is presented, and a rational function is developed, expressing this ergographic situation. The formula was tested experimentally by having two subjects engage in a simple finger exercise. The resulting ergograph indicates that the function expresses the general trend of the data but that some systematic deviations from the formula are apparent. It is hoped that this development will aid in studies of motor functions as related to such other variables as age, motivation, and effects of drugs.

3571
Ugedo Abril, J. 1953
[WAR NEUROSIS IN THE AIR FORCE]
Neurosis de guerra en las fuerzas aereas. — Revista de aeronáutica (Madrid), no. 149: 289-296. April 1953. In Spanish.
DLC (TL504.R516, no. 149)

A review is presented of the causes, symptoms, prevention, treatment, and prognosis of neuroses suffered in military action, with particular regard to aviators. The information is based mainly on American studies carried out during and after the Korean campaign. Under combat conditions, various stages can be distinguished in the progress of a neurosis: an initial stage of heightened aggressiveness; an increasing loss of self-confidence, accompanied by a conscious effort to suppress the rising anxiety; and, finally, a loss of the facility of resistance and ensuing collapse. Intervention at the earlier formative stages may prevent the outbreak of a neurosis. For this reason, the effectiveness of diagnostic methods is of great importance. Neuroses during and after recovery from injuries form a special category, and the distinction between conscious attempts of malingering and subconscious processes is often hard to make.

3572
Ulett, A. A., 1953
and G. Gleser
PSYCHIATRIC SCREENING OF FLYING PERSONNEL: THE DEVELOPMENT OF EMPIRICAL SCALES FOR THE PREDICTION OF ANXIETY-PRONENESS FROM THE EEG AND REACTION TO INTERMITTENT PHOTIC STIMULATION. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract AF-33(038)-13884); issued by School of Aviation Medicine, Randolph Field, Tex. June 1953. iii + 10 p. (Project no. 21-0202-0007, Report no. 4). AD 19 668 PB 110957

This report describes the development and validation of empirical scales for quantitative scoring of the resting and photically driven EEG and photically-induced subjective sensations as predictors of anxiety-proneness. When used in combination, this procedure selected 11% of non-anxiety-prone and 59.4% of anxiety-prone normal subjects and 65.5% of anxious patients.

3573
Ulett, G. A. 1953
G. Gleser, P. Starr, J. Haddock, L. Lingley, and A. Lawler
PSYCHIATRIC SCREENING OF FLYING PERSONNEL: FURTHER STUDIES TOWARD THE DEVELOPMENT OF AN ELECTROENCEPHALOGRAPHIC SCREENING TECHNIQUE. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract AF 33(038)-13884); issued by School of Aviation Medicine, Randolph Field, Tex. Aug. 1953. iii + 25 p. (Project no. 21-0202-0007, Report no. 5). AD 19 569 PB 112130

This report describes the validation of previously developed scales for the detection of anxiety-prone individuals based upon the basic EEG and the EEG changes and subjective responses induced by intermittent photic stimulation. A sample of 110 subjects was used. The individual's proneness to develop anxiety under stress was rated by means of psychological tests and two psychiatric interviews. Two provisional scales for scoring the basic EEG and the scale for subjective response to intermittent photic stimulation were found valid for the prediction of the criterion of anxiety-proneness in the new sample. (Authors' abstract)

3574
Ullrick, W. C.,
J. G. Krone, B. B. Brennan, and W. V. Whitehorn
EFFECTS OF EXERCISE ON RESPIRATION OF TISSUES OF ALTITUDE ACCLIMATIZED RATS. — Federation Proceedings, 13 (1[I]): 154-155. 1954. DLC (QH.301.F37, v. 13)

The effects of exercise on tissue respiration of albino rats acclimatized to 18,000 ft. simulated altitude were studied. Using standard Warburg technique, respiratory rates of liver, ventricle, kidney, adrenal, and diaphragm slices from 4 albino rats maintained at altitude for 35 days and exercised at altitude 4 hr. every other day were compared with rates of tissue from 6 similarly exercised controls. Results under 100% and 20% in vitro oxygen concentrations show that respiration of liver, ventricle, kidney, and diaphragm tissue did not differ from control values. Acclimatized adrenal tissue showed higher than normal rates on a dry-weight basis but not on a nitrogen basis, the percentage of protein of adrenal tissue significantly increasing at altitude. Results confirm previous experiments on unexercised animals with regard to ventricle, liver, diaphragm, and adrenal respiration. Decreased kidney respiration in acclimatized unexercised rats reported previously returns to normal values with exercise, for reasons not understood. It is concluded that the "unknown tissue factor in acclimatization" is accounted for by other mechanisms than a change in metabolism at the cellular level, probably essentially by increased vascularization of the tissues. (From the authors' summary)

3575
(Universal Match Corp.)
THE DEVELOPMENT OF A METHOD FOR PREDICTING RESPIRATORY VOLUMES IN MONKEYS. — Universal Match Corporation, St. Louis, Mo. Progress Report no. 3 (April 1 through April 31, 1954), May 4, 1954. 5 p., 4 tables, 5 charts. (Contract DA-18-064-CML-2515). AD 32 594
UNCLASSIFIED

A total of 165 respiratory measurements were made on 10 Macaca mulatta and 7 M. iris monkeys. The measurements were grouped as follows: 60 on quiescent M. mulatta, 70 on normally active M. iris, and 35 on quiescent M. iris. Data indicated that active M. mulatta breathed 300-400% more air than predicted by the formula developed by A. C. Guyton (Amer. Jour. Physiol., 150 (1): 70-77. 1947), which states: Respiratory Volume per Minute (in cubic centimeters) = 2.10 x (Weight in Grams)$^{3/4}$. Quiescent M. mulatta and active M. iris breathed about 50% more than the Guyton value. Quiescent M. iris exhibited a close correlation with Guyton's equation. Preliminary experiments were initiated in an attempt to find a direct method for measuring respiratory volume. (AD abstract, modified)

3576
Vacca, C., 1953
and C. Koch
[RESEARCH ON TWO NEW ANTI-KINETOSIS ACTION DRUGS FOR THE PREVENTION OF AIR-SICKNESS] Ricerche di due nuovi farmaci ad azione antichinetosica per la prevenzione del mal d'aria. — Atti del V° Congresso di medicina aeronautica (Napoli, 2023 Settembre, 1953). Parte III: Communicazioni, p. 537-542. In Italian, with English summary (p. 541-542).
DNLM (W3C0943a)

Experiments were conducted on 220 subjects exposed to simulated conditions inducive of air-sickness. One hundred mg. of P. 47 Farmitalia (N-[B-benzylphenylamine]-ethylpiperidine) or 50 mg. of Neo-Istafene (p-chlorbenzhydryl - m - methyl-benzyl-diethylene-diamine chlorhydrate) were administered from 3/4 to 1 hour before exposure. Both drugs produced a satisfactory anti-kinetosic effect with very mild toxic manifestations (sleepiness in 1/5 of the subjects 4-5 hours after

administration). The effectiveness of the drugs is credited to their action on the neuro-vegetative system. (Authors' summary, modified)

3577
Vacca, C.,
and E. Boeri
[CHANGES OF MUSCULAR LACTIC DEHYDROGENASE ACTIVITY IN SOME RATS SUBMITTED TO PROLONGED HYPOXIA] Variazione dell'attività lattico-deidrogenasica muscolare in ratti sottoposti ad ipossia prolungata. — Rivista di medicina aeronautica (Roma), 17 (4): 399-402. Oct.-Dec. 1954. In Italian, with English summary (p. 401).
DLC (TL555.A1R5, v. 17)

Rats elevated to a simulated altitude of 9000 m. for four hours a day for fifteen days showed a decrease in muscular lactic dehydrogenase activity due to hypoxia.

3578
Van Ackeren, J. F.
MEDICAL ASPECTS OF SEARCH AND RESCUE. – Military Surgeon, 114 (4): 276-279. Apr. 1954.
DLC (RD1.A7, v. 114)

Present-day search and rescue operations are concerned with aircraft as well as ships. Components of both services can perform a most useful and sometimes indispensable function in supplementing their own search and rescue facilities. Survivors from aircraft in the high seas can usually be rescued more effectively by ship while aircraft are more effective in searching for lifeboats. The medical aspects involved are outlined; preparedness on the part of the victim and training on the part of the rescuer are of paramount importance. The article enumerates survival times under different conditions and indicates measures that can be taken to lengthen them. It is suggested, that all persons engaged in search and rescue work, should have a thorough training in first-aid measures.

3579
Van Eyck, 1952
Vechmans, M. Portmann, and Maduro
[OCCUPATIONAL DEAFNESS: DISCUSSION OF THE REPORT] Les surdités professionnelles—discussion du rapport. — Société française d'oto-rhino-laryngologie: Congrès de 1952. (Paris), 59 (pt. 2, Comptes rendus des séances): 93-96. 1952. In French.
DNLM (W1S0719, v. 59)

In a discussion of a report on industrial deafness presented by Maduro, Lallemant, and Tomatis (cf. item no. 3150) some related points of interest are presented. Among the topics discussed are critical and pain sound intensity thresholds, effects of pure tones on hearing, and ultrasonic studies.

3580
Van Fossan, D. D.
EFFECTS OF ACCLIMATIZATION TO HYPOXIA ON THE HEMOGLOBIN MOLECULE. A. DEVELOPMENT AND PROOF OF TECHNIQUES. – School of Aviation Medicine, Randolph Field, Tex. June 1954. 7 p. (Project no. 21-1201-0013, Report no. 7). AD 34 745
PB 114588

By use of the aluminum oxide column, hemoglobin of both adult and fetus has been fractionated into three distinct components. The proportion of each component in fetal hemoglobin is different from that in adult hemoglobin. The separated components were tested for electrophoretic mobility, resistance to alkali, and peroxidase activity. The results establish that the three components of the fetus differ from those of the adult; there is no component common to both. This combination of techniques is believed to be quite sensitive enough to be used for the general and characterization of abnormal hemoglobins. (Author's summary)

3581
Van Fossan, D. D.
SEPARATION AND CHARACTERIZATION OF COMPONENTS OF FETAL

AND ADULT HEMOGLOBIN. — Federation Proceedings, 13 (1I): 156. 1954. DLC (QH.301.F37, v. 13)

Normal fetal and adult hemoglobins from washed erythrocytes were chromatographed with water on duplicate columns of aluminum oxide. Three red bands (components) appeared and were separated. Each component was shown to be an oxygen-carrying hemoprotein. The relative proportion of each component in fetal hemoglobin is significantly different from the corresponding proportions in adult hemoglobin. Characterization of each of the separated components by alkaline denaturation, peroxidase activity, and electrophoretic migration shows that no component is common to both adult and fetal hemoglobins thus indicating the normal existence of 3 hemoglobin components in adult which differ from the 3 components in fetal hemoglobin. Hemoglobin of the dog also is composed of 3 components. Dogs acclimatized to hypoxia (20,000 ft. simulated altitude for 1 yr.) possess hemoglobin which cannot be distinguished from that of control dogs by any of the above techniques. These studies are being extended to carbon monoxide acclimatized dogs and humans with sickle cell anemia and other pathological conditions. (From the author's summary.)

3582
Van Liere, E. J.,
H. S. Fang, and D. W. Northrup
RESISTANCE IN HYPOXIA PRODUCED BY POLYCYTHEMIA IN RATS. — Amer. Jour. Physiol., 178 (3): 503-504. Sept. 1954. DLC (QP1.A5, v. 178)

The decreased propulsive motility of the small intestine produced by hypoxia corresponding to a simulated altitude of 18,000 ft. was prevented when rats were made polycythemic by daily injections of cobaltous chloride. This resistance to hypoxia did not result, however, when the rats were subjected to a simulated altitude of 24,000 ft. (Authors' summary)

3583
Van Sickle, A. W.
FATIGUE FACTOR. — Combat Crew, 5 (3): 20-21. Sept. 1954. DLC

The importance of personal equipment in successful flying is emphasized. Procedures for the maintenance of equipment are suggested. The development of new equipment to meet anticipated requirements may be furthered by making known these requirements, through proper channels, to the Aero Medical Laboratory at the Wright Air Development Center.

3584
Van Sickle, A. W.,
and R. J. Hogan
IN-FLIGHT FEEDING DURING SUSTAINED FLIGHT OF SINGLE-PLACE JET AIRCRAFT. — Jour. Aviation Med., 25 (5): 523-529, 555. Oct. 1954. DLC (TL555.A1A4, v. 25)

A description is given of a flight of 8 F-84-G aircraft from Georgia across the central Atlantic ocean to a North African air base; this was a non-stop flight, utilizing in-flight refueling, and the pilots were in their respective craft for a period of 10 1/2 hours. The problem of the in-flight feeding of these pilots is discussed under the following headings: preflight preparation and feeding (adequate rest, simple food intake, and avoidance of alcoholic beverages); in-flight water (vacuum bottle with special spigot on modified uninsulated G.I. canteen); and in-flight nutrition (chocolate milk, a liquid food product of meat and vegetables, food packet of candy, chocolate, and chewing gum). At the conclusion of the mission, the pilots appeared still fresh; they were generally pleased with the feeding arrangements, but expressed a desire for more water; and those who had flown planes without the vacuum bottle expressed the feeling that the water should be cooled. The authors feel that the experiment was a success, considering the fact of its uniqueness in the U.S.A.F.

3585
Vanderplas, J. M.
SOME PERCEPTUAL FACTORS INVOLVED IN THE DESIGN OF OBSTACLE WARNING DISPLAYS FOR AIRCRAFT. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Note no. WCRD-TN-54-9, March 1954. iii + 14 p. (RDO no. 694-45). AD 65 872 PB 137968

This report constitutes a discussion of some perceptual problems involved in visually presenting information for spatial and geographic orientation of the pilot in flight and in the design of an aircraft display for obstacle warning. A summary is presented of general principles of visual perception of space, along with a discussion of how these principles may be applied in several representative designs of a pictorial or symbolic display for geographic orientation and obstacle warning. Several types of displays, both pictorial and symbolic, are discussed as examples of application of the principles, and suggestions are presented for their application to an obstacle warning display method. (Author's abstract)

3586
Vercesi, C., 1953
and L. DiRenzi
[OBSERVATIONS ON DAMAGE TO THE SKIN CAUSED BY KEROSENE] Manifestazioni tossiche da kerosene. – Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 543-556. In Italian, with English summary (p. 555). DNLM (W3C0943a)

The composition of kerosene, and the local and general toxic manifestations caused by hydrocarbons of the aliphatic and aromatic series are discussed. Two cases of dermatitis caused by kerosene, which were observed in flight personnel, and in which the entire organism was involved, are described. Preventive and therapeutic measures are proposed. (Authors' summary, modified)

3587
Vigliani, E. C., 1953
and M. Pasargiklian
[ON ENERGY EXPENDITURE AND RESPIRATORY EFFICIENCY DURING PROLONGED MUSCULAR WORK] Sul consumo energetico e sul rendimento respiratorio durante lavoro muscolare protrato. — Medicina del lavoro (Milano), 44 (6-7): 313-324. June-July 1953. In Italian, with English summary (p. 322-323). DNLM

Caloric expenditure, pulmonary ventilation, and respiratory efficiency were studied during a series of marches at different speeds (from 0.8 to 7 km. per hour) on various gradients (up to 30%) of the transporting ergometer, for periods up to 5 hours. (1) Caloric expenditure of less than 8 calories per kg. of body weight per hour did not affect the work efficiency and the respiratory ventilation; (2) caloric expenditure of more than 8 cal./kg. body wt./hr. resulted in an increase in energy expenditure and respiratory ventilation in the course of the exercise thus producing a progressive lowering in both the work efficiency and respiratory efficiency. It is concluded that muscular work of 8 cal./kg./hr. can be continued for many hours, whereas work intensity greater than 8 cal./kg./hr., results in fatigue.

3588
Vinson, C. D.
EAT RIGHT TO FLY RIGHT. – Combat Crew, 4 (11): 14-17. May 1954. DLC

The dangers of food poisoning, improper nutrition, and lack of rest are discussed as producing fatigue and leading to pilot error. The importance of high-carbohydrate, low-protein preflight diet is emphasized.

3589
Violette, F.
[THE PHYSIOLOGICAL EFFECTS OF EXPLOSIVE DECOMPRESSION AND THEIR MECHANISM] Les effets physiologiques des décompressions explosives et leur mécanisme. – Médecine

aéronautique (Paris), 9 (3): 223-224. 1954. In French.
DLC (TL555.M394, v. 9)

This is essentially a review of the physiological effects of explosive decompression and the physiological mechanisms involved in it. Special sections deal with the history of research, methods and results of experimental study on animals and man, and the author's own studies on this subject.

3590
Violette, F.
[A STUDY OF GAS FORMATION IN THE ORGANISM DURING EXPLOSIVE DECOMPRESSION: FREE EXPANSION AND LIMITED EXPANSION] Etude de l'évolution des gax de l'organisme au cours des décompressions explosives; l'expansion libre et l'expansion limitée. — Médecine aéronautique (Paris) 9 (1): 76-77. 1954. In French.
DLC (TL555.M394, v 9)

It is stated that, according to American researchers, injuries from explosive decompression are largely due to the effects of rapid expansion of internal gases. The expansion of gases has been expressed by these researchers by the formula, $E = \frac{Pc - 47}{Pa - 47}$, in which Pc represents the cabin pressure and Pa, the outer pressure. This formula, however, is contradicted by experimental evidence. According to it, infinite expansion would occur at approximately 18,000 m. This, however, does not conform to observations. The following formula is proposed by the author: $E = \frac{Pc}{Pa}^{\frac{1}{n}}$, in which n is a coefficient of the order 1.1. This formula has proven to conform more accurately to the findings and can be applied to gas expansions in the different organs. It is concluded that gas expansion as a cause of injuries applies primarily to the lung.

3591
Violette, F.
[SOME PHYSIOLOGICAL EFFECTS OF EXPLOSIVE DECOMPRESSION] Quelques effets physiologiques des décompressions explosives. — Journal de physiologie (Paris), 46 (1): 548-552. 1954. In French. DNLM

Extrapulmonary thoracic pressures, and vena caval and pulmonary arterial pressures were greatly increased during explosive decompression in chloralosed dogs. Subsequent evaluation of different pressure curves show that pulmonary artery pressure produces intrapulmonary pressure, thereby causing all of the effects observed, although direct registration was not possible. Increased cerebrospinal fluid pressure explains the dazed sensation experienced by human subjects during explosive decompression. A major increase in vena caval pressure gives rise to pressure changes which are propagated within the venous system. This phenomenon may provide a satisfactory interpretation of the various pulmonary, sub-endocardial, subdural, and retrotympanic hemorrhagic lesions observed as sequels of decompression.

3592
Violette, F.
[INVESTIGATIONS ON THE LAW OF PULMONARY EXPANSION IN EXPLOSIVE DECOMPRESSIONS] Recherches sur la loi de décompression pulmonaire dans les décompressions explosives. — Comptes rendus de l'Académie des sciences (Paris), 238 (17): 1735-1739. April 26, 1954. In French.
DLC (Q46.A14, v. 238)

In the dog the expansion of the lungs follows the general law of decompression in a closed vessel. The difference is that the lung decompression is also influenced by two outflow coefficients, one corresponding to the beginning and the other, half as strong, to the end of the decompression. General formulas could be developed which would allow to determine the outflow coefficients for tracheotomized and un-tracheotomized dogs. The primary coefficient varies between 1/71.5 and

1/22 (mean value, 1/33.3) for 10 experiments; the secondary coefficient is between 1/115.5 and 1/55 (mean value, 1/71.9) for 10 experiments. It would be interesting to study the physiological significance of these factors. At the conclusion of the article some theories are developed which attempt an explanation.

3593
Virgili, R. 1953
[FURTHER OBSERVATIONS ON "FLIGHT PHOBIA"] Altre osservazioni sulle "fobie del volo". — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 568-572. In Italian, with English summary (p. 572).
DNLM (W3.C0943a)

An outline is presented of the symptoms, prognosis, therapeutic implications, and medico-legal aspects of flight phobia.

3594
Virgili, R. 1953
[INDICATIONS AND PRACTICAL IMPORTANCE OF ELECTROENCEPHALOGRAPHY IN MILITARY AVIATION] Indicazioni e improtanza dell'elettroencefalografia nell'aeronautica militare. — Atti del V° Congresso di medicina aeronautica (Napoli, 20-30 Settembre 1953). Parte III: Comunicazioni, p. 557-567. In Italian, with English summary (p. 566). DNLM (W3C0943a)

Results of electroencephalographic investigations conducted at the Medico-Legal Institute in Rome are presented. The value of encephalography as an aid in selecting and examining air personnel and in detecting organic diseases of the central nervous system and its applications in the study of epilepsy and of skull injuries and in medico-legal practice are discussed. (Author's summary, modified)

3595
Virgili, R.
[PSYCHONEUROTIC DISTURBANCES OCCURRING IN FLIGHT PERSONNEL] Disturbi psiconevrotici nel personale aeronavigante. — Rivista di medicina aeronautica (Roma), 17 (2-3): 247-256. April-Sept. 1954. In Italian, with English summary (p. 254).
DLC (TL555.A1R5, v. 17)

Also published in: Minerva medica (Torino), 45 (94): 1362-1365. Nov. 24, 1954. In Italian.

Flying may be responsible for the occurrence of a special kind of psychic disorder, the chief causal factor being anxiety resulting from true or presumed conditions of risk. Personality traits on the part of the flyer play an important role; a temperament inadequate for the task may explain early manifestations of "psychological failures". Repeated emotional shocks, indispositions, and physical fatigue may cause delayed psychic disturbances (weariness of flying) with neurasthenic symptoms. When cases of psychoneurosis have developed, the aviator's fitness to fly is seriously jeopardized. (Author's summary, modified.)

3596
Voas, R. B.,
and W. B. Webb
BEHAVIOR IN A STRESS SITUATION: THE INFLUENCE OF A "SOCIAL EFFECT". — In: (Naval School Aviation Med.), Miscellaneous tests and minor evaluations, p. 39-42. Pensacola, Fla., Oct. 20, 1954. (Project Report no. NM 001 058.25.26). AD 55 782(h)
UNCLASSIFIED

A study was made of the role of social pressure on the behavior of 44 groups of Naval Aviation Cadets and 38 groups of student officers during an indoctrination experience in a low-pressure chamber. Records of the 11- or 12-subject groups were divided into subgroups: (1) mask-on (MO) groups in which one or more members had put on their oxygen mask during the first 5 minutes of the 10-minute period, and (2) no mask-on (NMO) groups in which no member had put on a mask in the first 5 minutes. Data indicated that during the second 5-minute period, a significantly greater

proportion of individuals in the MO group put on their mask in comparison to the NMO groups. The only essential difference between the two groups was the antecedent actions of other group members. Thus, social pressure appeared to be an effective variable in determining a response to stress produced by mild anoxia. (AD abstract)

3597
Voĭtkevich, V. I. 1952
[CONCERNING THE CONDITIONED-REFLEX REGULATION OF BLOOD OXYGEN SATURATION] Ob uslovno-reflektornoĭ reguliatsii nasyshcheniia krovi kislorodom. — Fiziologicheskiĭ zhurnal S.S.S.R. (Leningrad), 38 (4): 452-458. 1952. In Russian.
DLC (QP1.F57, v. 38)

Experiments were conducted with humans. A recording oxyhemometer was attached to the ear of the test subject, and a mask, such as is used in some basal metabolism tests, was firmly attached to the face, covering the nose and mouth. The mask was connected to bellows from which the test subject could be supplied with pure oxygen or different kinds of inert gas-oxygen mixtures in varying ratios. Ventilation was recorded by a respirometer. Unconditioned reflex stimulation was attained by a mixture of 10-11% of oxygen and 90% of nitrogen. Conditioned-reflex effects were attained by the ticking of a metronome at the rate of 60 beats per minute, or by telling the subject, "You are being supplied with a poor air mixture," etc. The results of the tests indicated that any indifferent stimulator can act as a conditioned signal of an oncoming state of hypoxia. However, as a rule, the conditioned reflexes in response to a hypoxia stimulator regularly elicit an increased rate of respiration and circulation, both acting as agents of hypoxia reduction.

3598
Voĭtkevich, V. I.
[THE EFFECT OF SLEEP ON THE SATURATION OF ARTERIAL BLOOD WITH OXYGEN] Vliianie sna na nasyshchenie arterial'noĭ krovi kislorodom. — Fiziologicheskiĭ zhurnal S.S.S.R. (Leningrad), 40 (3): 269-273. 1954. In Russian. DLC (QP1.F57, v. 40)

In medicated narcotic and natural sleep, the degree of oxygen saturation of the arterial blood is lowered. It fell by 1.5-4% in all the persons under study and stayed at that level throughout the entire period of sleep. This oxygen saturation lowering is explainable on the assumption that sleep, as a form of diffuse inhibition, is accompanied by a lowered stimulability of the respiratory center, as a result of which the lung ventilation is also lowered, due to a lowering in the frequency of the respiratory rhythm. Approaching awakening is manifested by increased oxygen saturation in the blood some minutes before the first signs of awakening and before the opening of the eyes. (From the author's summary)

3599
Von Ahn, B.
ELECTROCARDIAGRAM IN TOBACCO SMOKING DURING HYPOXIA: A PRELIMINARY ACCOUNT. — Acta medica scandinavica (Stockholm), 148 (1): 101-121. 1954. In English. DNLM

The author investigated the effect of tobacco smoking and nicotine on the ECG during hypoxia. The subjects consisted of males with clinically healthy hearts in the age groups 20-26 years (Group I) and 38-51 years (Group II), respectively. Group I consisted of 20 smokers and 14 non-smokers, group II of 10 smokers and 2 non-smokers. After 6 min. of hypoxia, when O_2 saturation, heart rate, and respiratory rate were stabilized at constant levels, tobacco smoke was administered via a special lateral mouthpiece for 8 min. The test was concluded after 10-20 min. hypoxia. The investigation shows that a linear correlation exists between the height of the T-waves and the simultaneously occurring increase in the heart rate on smoking. The T-waves

are thus not depressed in height on smoking more than would correspond to a similar increase in heart rate under physiological conditions. Hypoxia as such does not accentuate the effect of tobacco on the ECG except in isolated cases. In one case (a 38-year-old smoker with a healthy heart) smoking produced pathological changes in the S-T intervals and T-waves (electrocardiagraphic coronary insufficiency). The effect of nicotine can entirely or partly be eliminated by means of dihydroergotamine (DHE 45). Tobacco smoking during hypoxia has thus, as a rule, no significant effect on ECG. (Author's summary)

3600
Von Braun, W., 1953
F. L. Whipple, and W. Ley
CONQUEST OF THE MOON. — 126 p. New York: The Viking Press, 1953. DLC (TL799.M6V6)

A popular description of a hypothetical voyage to the moon, based on contemporary engineering knowledge and technical ability is presented. The scientific principles involved in making the trip are discussed. Sixteen colorful illustrations and diagrams accompany the text.

3601
Wald, G.
ON THE MECHANISM OF THE VISUAL THRESHOLD AND VISUAL ADAPTATION. — Science, 119 (3104): 887-892. June 25, 1954. DLC (Q1.S35, v. 119)

From a series of observations, discussed in detail, the author establishes the following hypothesis: The threshold of a dark-adapted rod depends upon its entire content of rhodopsin. The rod is a compartmented structure capable of a stepwise response. Each compartment contains a quantity of rhodopsin, any molecule of which on absorbing a quantum of light, discharges the compartment. A large rise of threshold occurs with very little bleaching of rhodopsin—a minimum of 1 molecule per compartment. On absorbing a first quantum of light a compartment cannot contribute again until all its rhodopsin is restored. Rhodopsin remaining in the compartment although inert to excitation continues to absorb light, which delays the eventual recovery of the compartment. The photochemical system of cones is discussed in view of the small portion of visual pigment they contain. Quantitative data from comparison of a physico-chemical model of the eye with the responses of a dark-adapted subject are cited in support.

3602
Wallach, H.,
and P. Austin
RECOGNITION AND THE LOCALIZATION OF VISUAL TRACES. — Amer. Jour. Psychol., 67 (2): 338-340. June 1954. DLC (BF1.A5, v. 67)

It was attempted to clarify the question of whether or not there is an effect of retinal position on recognition. An ambiguous figure, which may be recognized differently in different positions (as either "a dog" or "a chef") was used. An effect of position would be demonstrated if the ambiguous version were recognized as that figure previously given in the same retinal position. Results were computed for 48 subjects. Thirty-six subjects recognized the ambiguous figure as the version presented previously in the same retinal position. Twelve subjects recognized the figure as the version presented on the other side of the fixation mark. The difference is significant beyond the 0.2% level. Conclusions reached were that a significant effect of retinal position was obtained. However, the role played by left hemispheric dominance is a factor to be investigated further.

3603
Wang, S. C.,
and H. I. Chinn
EXPERIMENTAL MOTION SICKNESS IN DOGS: FUNCTIONAL IMPORTANCE

OF CHEMOCEPTIVE EMETIC TRIGGER ZONE. — Columbia Univ. Coll. of Physicians and Surgeons, New York; issued by School of Aviation Medicine, Randolph Field, Tex. June 1954. 8 p. (Project no. 21-1208-0012, Report no. 4). AD 34 744 PB 114589

Also published in: Amer. Jour. Physiol., 178 (1): 111-116. July 1954.

Motion sickness was experimentally induced by means of a standardized swinging procedure. Only susceptible dogs which showed emesis within 25 minutes of swinging at weekly intervals were selected for surgical removal of the chemoceptive trigger zone. The results indicated that the trigger-zone-ablated dogs showed no vomiting responses after long exposures to swinging motion, while the sham-operated dogs remained sensitive to this motion. It is, therefore, concluded that the emetic trigger zone is important in the medication of motion sickness. As in motion-sickness studies on human subjects, there are etiological factors other than vestibular stimulation. Two of the 12 dogs, following trigger-zone operation, did not become refractory to motion sickness. The possible alternative mechanisms in which vomiting manifests itself in the absence of the chemoceptive emetic trigger zone are discussed. (Authors' summary and conclusion)

3604
Ward, M.
HIGH ALTITUDE DETERIORATION. — Proc. Roy. Soc. (London), 143 (910): 40-42. Dec. 1954.
DLC (Q41.L7, v. 143)

High altitude deterioration is associated with a gradual diminishing of man's capacity for work, with insomnia, lack of appetite, loss of weight and increasing lethargy. Symptoms similar to these, but more acute in onset, appear during rapid ascent to high altitudes without acclimatization. Exhaustion at high altitudes above a certain height often can be cured only by a descent to lower levels. In the past, deterioration in mountaineers at high altitudes was intensified by dehydration, mainly due to loss of water from lungs, and by starvation. In the 1953 Everest expedition, some loss of weight occurred in spite of an average intake of 3000 calories per day by the members of the camping above 21,000-ft. altitudes. Subjectively, the members of the expedition noticed an overwhelming lassitude, which increased with altitude and length of stay. All tasks involving some degree of precision and skill, except those that were routine and practiced, required more time for completion. The lessening of capacity to work during longer exposures to 21,000 ft. or above was tested on two subjects. The author, after spending 18 days at 21,000 ft. and above without oxygen, found himself extremely fatigued during the test, which consisted of stepping on and off of a 10-in. box, 30 times per minute. He could keep up this rate only for 1 to 2 min. and was not able to continue it for the duration of 5 min. Another member who had spent only 6 days at 21,000 ft. completed a similar test without undue fatigue.

3605
Warrick, M. J.
COUNTERS FOR AIRBORNE USE. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 54-266, June 1954. iii+9 p. (RDO no. 694-38). AD 45 991
PB 111564

This report presents an integrated survey and interpretation of psychological research relevant to the design of counters for use on airborne equipment [to display such information as distance, elapsed time, fuel, navigational coordinates]. The merits and demerits of a counter as compared with other methods of presenting information in typical applications are discussed. Such design problems as the speed and direction of rotation of a counter and the location and mode of operation of its associated control are analyzed in detail. (Author's abstract)

3606
Wcisto, W. 1952
[THE DYNAMICS OF THE HEART IN VARIOUS POSTURES] Dynamika serca w róznych postawach. — Acta physiologica polonica (Warszawa), 3 (Suppl.): 197-201. 1952. In Polish, with English summary (p. 201). DNLM

Detailed descriptions are given of cardiovascular and respiratory changes in men and dogs immediately after passive or active movement from horizontal to vertical positions with the head up or down. A tilting turntable upon which the subjects were strapped was used to obtain passive positioning. Included were measurements of cardiac output, arterial and venous pressure, pulse rate, and thoracic vital capacity. It is stated that the described circulatory and respiratory changes did not take a normal course in human subjects who were tired or weakened from other causes, or in dogs that were exhausted by long experiments or had suffered injuries to the presso-sensory mechanism.

3607
Webb, H.
FAILURE OF AERONAUTICAL PERFORMANCE AS THE PRESENTING SYMPTOM OF DISEASE. — Jour. Aviation Med., 25 (5): 541-542, 560. Oct. 1954. DLC (TL555.A1A4, v. 25)

A neglected clinical aspect of aviation medicine is presented. Two cases are described, involving senior air officers who first gave evidence of disease, not through clinical symptoms per se, but by their failure to meet their flying requirements. One officer was discovered to have amebic dysentery which had gone undetected for years, and the other was found to be suffering from latent malaria, again undiscovered for a number of years. Both men were returned to active duty after treatment; the author asks for more attention to the clinical aspects of aviation medicine.

3608
Webb, W. B.,
J. T. Bair, and R. K. Ambler
ATTRITION DATA AS A CRITERION: I. REASONS FOR WITHDRAWAL AND FLIGHT PERFORMANCE. — Tulane Univ., New Orleans, La. (Contract Nonr-47502); and Naval School of Aviation Medicine, Pensacola, Fla. June 1, 1954. 6+6 p. (Project Report no. NM 001 058.05.07). AD 46 695
UNCLASSIFIED

The purpose of this study was to clarify the relationship between performance, aptitude, and motivation of cadets resigning from Naval Air Training. Flight grades of 200 voluntary withdrawals were obtained. The high and low quartiles were analyzed in terms of their reasons for leaving revealed in research interviews. The low group expressed far more anxiety toward flying, while the high group reported more reasons not associated with flying. Furthermore, the 'lows' had significantly lower flight aptitude scores than the 'highs'. The 'highs' had aptitude scores slightly higher than a group of 'successfuls'. Criteria implications are discussed. (Naval School of Aviation Medicine abstract)

3609
Webb, W. B.,
and R. K. Ambler
THE CONDITIONS OF SELECTION TESTING IN THE FIELD. — In: (Naval School Aviation Med), Miscellaneous tests and minor evaluations, p. 50-54. Pensacola, Fla., April 20, 1954. (Project Report no. NM 001 058.25.15). AD 50 299(1) UNCLASSIFIED

A total of 251 Naval Aviation Cadets were questioned about their reactions to the conditions under which they took the Naval Air Training Program selection tests. 48% of the cadets reported as the sole applicant, and 42% reported in groups of 5 or smaller. The tests were given by enlisted men below the rate of Chief 57% of the time. Chief petty officers conducted 23% of the ses-

sions and commissioned officers only 20%. The environmental testing conditions were generally held to be adequate. Methods of administration were generally acceptable. Only 13 of the 251 subjects indicated that either the administration was not taken seriously, or that the tester did not appear to adhere to the rules or indicated dissatisfaction with the method of administration. (AD abstract)

3610
Webb, W. B.,
E. P. Hollander, and D. J. Mitchell
MEASUREMENTS OF MORALE. — Tulane Univ., New Orleans, La. (Contract NR 154-098); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Research Project no. NM 001 077.01.07). Joint Project Report no. 7. June 25, 1954. 5 + v p. AD 44 404
UNCLASSIFIED

The relation between three measures of morale, based on a single definition of morale (enthusiasm for the naval air training program), was studied in aviation cadets. The techniques of measurement used were: (1) an attitude questionnaire; (2) a self-evaluation, and (3) a peer judgment. An intercorrelation of these measures revealed that they are related on commonly low level. It was found that group estimates (peer judgment form) and self-evaluations were considerably and significantly superior to the attitude questionnaire in predicting the pass-withdraw criterion. The use of such measures at the preflight level may have considerable predictive value in identifying individuals whose morale is inadequate for the successful pursuance of the training program. (Authors' summary, modified)

3611
Webb, W. B.
MEDICAL NEEDS AND ABSENTEEISM IN A HEALTHY POPULATION. — Indus. Med. and Surg., 23 (9): 416-417. Sept. 1954. DLC (RC963.A37, v. 23)

This study presents information in answer to two fundamental questions related to medical care: (1) what is the extent of the medical requirements in a healthy population; and (2) to what extent do these requirements result in absence from the job? The dispensary visits of 1,080 Naval Aviation cadets for eight months were studied. It was found that the extent of dispensary visits was considerable: about six men in 10 made at least one dispensary visit during the period; the number of sick calls ranged from 0 to 43; 5% of the group made 10 or more visits, and 10% of the group made five or more visits during the period of time studied. Fortunately, the medical requirements did not result in extensive interference with job performance: 67% of the visits resulted in immediate return to duty; only 33 visits required hospitalization; only one-tenth of one percent of the man days available during the period were lost to off-duty assignments. (Author's summary)

3612
Webb, W. B.
THE PROBLEM OF THE "UNDESIRABLE" PEER RATINGS. — In: Naval School Aviation Med., Miscellaneous tests and minor evaluations, p. 47-49. Pensacola, Fla., April 20, 1954. (Project Report no. NM 001 058.25.14). AD 50 299(k) UNCLASSIFIED

Peer ratings on leadership of 6 sections of Naval Aviation Cadets were obtained by requesting nominations of the three highest and three lowest members of the group from each member of each section. These ratings were then converted to scores. The scores were converted to a form of standard scores by Fisher's rankit method so that the ratings could be used independently of the section. A biserial correlation was run between the derived standard score and the population dichotomized on the basis of having received one or more high nominations from the group as compared with having received no nominations as a high. The resultant biserial correlation between the algebraic sum ratings and a dichotomy based on re-

ceiving or not receiving a positive nomination was +0.87. (From the AD abstract)

3613
Webb, W. B.,
and C. Y. Nolan
RATINGS OF INSTRUCTIONAL PROFICIENCY: STUDENT RATINGS, SELF RATINGS, AND SUPERVISOR RATINGS. — Washington Univ., St. Louis, Mo. Research Note no. 1 of the Annual Report, [1954]. 6 p. (Contract NONR 816(02)). AD 37 814(a) PB 114222

Fifty-one instructors of the Naval Air Technical Training Program were rated by their students and by their supervisors on a "teaching proficiency" rating scale. In addition the instructors rated themselves on the same scale. It was found that the student ratings and the self ratings of the instructors were highly correlated. However, the supervisors' ratings were uncorrelated with either of these ratings, and, in fact, uncorrelated with any of the additional measures obtained. The discrepancy between student ratings and the instructors' ratings did not seem to be related to the judged proficiency of the teacher. On the basis of these findings the following recommendations are made: (1) Systematic self ratings should be introduced as a potential source of self-improvement in instructing. (2) Supervisors' ratings should not be used administratively and an immediate examination of the sources of supervisors' ratings should be made. (3) The General Classification Test (GCT), the level of schooling, and the instructional experience of instructors were found not to be related to instructional proficiency as judged by students or by the instructors themselves. (Authors' summary and recommendations, modified)

3614
Webb, W. B.
THE RELIABILITY OF THE PEER RATING. — In: Naval School Aviation Med., Miscellaneous tests and minor evaluations, p. 44-46. Pensacola, Fla., April 20, 1954. (Project Report no. NM 001 058.25.13). AD 50 299(j)
UNCLASSIFIED

Six classes of cadets gave leadership peer ratings by nominating the three highest and the three lowest members. Each member of the section gave such nominations on the variable of leadership. The reliability of the nominations was determined by the analysis of variance technique. The reliability of peer ratings for the total group's rating of an individual was acceptably reliable. An average reliability of 0.88 was satisfactory for testing purposes. (AD abstract)

3615
Webb, W. B.,
and N. D. Bowers
STUDENT PERFORMANCE AS A MEASURE OF INSTRUCTIONAL PROFICIENCY. — Tulane Univ., New Orleans, La. [Contract Nonr-47502]; and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 077.01.06). Joint Project Report no. 6, June 25, 1954. 1+7+4 p. AD 44 289 PB 123137

The extent of the differences between instructors was investigated by comparing the flight performance of the respective students of twelve Naval officers who had instructed the trainees through their first eleven airplane training flights. Performance was measured by the grades assigned the students on two check flights and on their latter stage of training. The performance of the students of the various instructors was significantly different, which indicated that some instructors were more effective than others in teaching students to fly. (AD abstract)

3616
Webb, W. B.,
and C. Y. Nolan
A STUDY OF THE USE OF OPEN END SENTENCES IN THE NAVAL AIR TECHNICAL TRAINING PROGRAM. — Washington Univ., St. Louis, Mo. Research Note no. 2 of the Annual Report, [1954]. 4 p. (Contract Nonr 816 (02)). AD 37 814 (b) PB 114222

Twenty-one open-ended sentences were administered to students of the Aviation Machinists Class "A" School. Eleven sentences were pointed at a definite subject matter and ten were completely unstructured as to subject matter. The completions could be scored reliably as to whether the statement given was an expression of a "positive" (or favorable) attitude, a "neutral" attitude, or a "negative" (or unfavorable) attitude. These attitudes were consistent from individual to individual in a retesting situation. The specific answers given to the completely unstructured items yielded fruitful information about the general training program itself. Since this technique can be reliably quantified it is recommended that it be more widely used as an evaluation procedure for instructors, programs, or more generalized morale questions where positive or negative attitudes of the subjects are considered critical. Where it is desirable to explore the qualitative "positive" or "negative" factors with individual instructors or with programs, the open-end sentence approach is recommended. (Authors' summary and recommendations, modified)

3617
Webb, W. B.
THE USE OF SEMI-STRUCTURED QUESTIONS AS COMPARED WITH THE USE OF CHECK LISTS. — In: Naval School Aviation Med., Miscellaneous tests and minor evaluations, p. 43-47. Pensacola, Fla., Oct. 20, 1954. (Project Report no. NM 001 058.25.27). AD 55 782(i) UNCLASSIFIED

Naval Aviation Cadets were asked about the expectancies of a training program. One group responded to two questions concerning the hardest part and the expected best liked part of the program. The other group responded to a check list derived from the items obtained in response to these questions by checking the three items that they expected to like best about the training program and the three items which they anticipated would give them the greatest difficulty. In comparing the two methods, first separate Chi-Square tests were performed for the frequencies of both the "like" and "hard" responses. The second comparison of the results of the two methods was made by a rank order correlation of the two categories. The expectancies revealed by both methods were similar but they were far from identical. It was concluded that the best technique probably would be dependent upon the problem at hand, but the use of different methods may modify the conclusions. (Author's summary and conclusions, modified)

3618
Weber, P.
[BRITISH EXPERIENCE IN SEVERE BURNS: THEIR RELATIONS TO AVIATION MEDICINE] De l'expérience anglaise en matière de grands brûlés: ses relations avec la médecine de l'aviation. — Médecine aéronautique (Paris), 9 (3): 305-317. 1954. In French.
DLC (TL555.M394, v. 9)

British and French experience has shown that the medico-surgical treatment of severe burns is a matter of greatest urgency requiring a high degree of specialization as well as modern facilities that would provide all necessary equipment and also an environment minimizing the grave danger of infection. Problems of transportation of patients to treatment centers, therapeutical methods applied in the various degrees of burns, and the psychological impact of experience with burn injuries on aviation personnel are also discussed.

3619
Webster, A. P.,
and H. N. Hunter
ACCELERATION. — Jour. Aviation Med., 25 (4): 378-379. Aug. 1954.
DLC (TL555.A1A4, v. 25)

A table is presented containing the following data: (1) relationship between the different types of acceleration (positive, negative, transverse prone, fluc-

tuating positive, and cyclic) and direction of body movement, type of aircraft maneuver, and tolerance limits under various degrees of experimental exposures in man; and (2) pathological effects on animals of varying degrees of various types of acceleration.

3620
Webster, J. C.,
H. R. Beitscher, and J. A. Silkwood
ACOUSTIC ATTENUATION OF NOISE SHIELDING DEVICES. — Navy Electronics Lab., San Diego, Calif. NEL Report no. 482, March 24, 1954. 12+1 p. AD 49 360 UNCLASSIFIED

Tests were made of the relative capabilities of the following types of noise-attenuating devices for use in aircraft: experimental shields covering the head, PDR-8 donut cushions (NAF 48490-1) in various mounts, insert type earphones (Airphone D-98), and combinations of these devices. It was found that, in the frequency range near 800 c.p.s. which is the most important for existing sonars, the most effective attenuators are the shields, followed in order by the donut cushions and the insert type phones. For listening comfort over long periods, the order of merit is exactly opposite. (Navy Electronics Lab. abstract)

3621
Webster, J. C.
DEVELOPMENT AND USE OF THE NEL RECORDED WARBLE TONE HEARING TEST. I. — Navy Electronics Lab., San Diego, Calif. NEL Report no. 546, Part I, Dec. 16, 1954. 20 p. AD 66 664 UNCLASSIFIED

Two forms of a recorded warble-tone test were developed, one designed to test hearing acuity in quiet on the frequencies 500, 1000, 2000, 4000, and 7000 cycles per second, and the other designed to test hearing acuity in quiet at 500, 1000, and 4000 cycles per second and hearing acuity in noise at 1000 and 4000 cycles per second. Test-retest reliability checks and validity checks showed these tests to be feasible when given from recordings (magnetic tape or phonograph disc) to groups over either earphone networks or multiple loudspeakers. The physical characteristics of the tonal stimuli, instructions for setting up the test, and two typical administrations of the tests are discussed. (Navy Electronics Lab. abstract)

3622
Weiner, J. S., 1952
and R. E. van Heyningen
SALT LOSSES OF MEN WORKING IN HOT ENVIRONMENTS. — Brit. Jour. Indus. Med. (London), 9 (1): 56-64. Jan. 1952. DLC (RC963.A23, v. 10)

The sweat and urinary loss of chloride have been studied in individuals working in hot conditions for short periods. Acclimatization to heat is only accompanied by a decrease in the chloride concentration of general body sweat if a negative chloride balance is induced by restriction of the chloride intake. Sweating for short periods (two hours) in unacclimatized subjects brings about a compensatory reduction of urinary chloride manifested after the subject leaves the hot room. This reduction is so great that the total loss of chloride may be less on days on which sweating occurs than on the control days. Attention is drawn to the limitations to the use of sweat collected in arm bags as a method of assessing the bodily salt balance. The bearing of these findings on the desirability of supplementing the salt intake in the diet is discussed. (Authors' summary)

3623 •
Weiss, B.
PRESSURE VARIATION, THE RANGE EFFECT, AND THE ACCURACY OF POSITIONING RESPONSES [Abstract]. — Amer. Psychologist, 9 (8): 491. Aug. 1954. DLC (BF1.A55, v. 9)

An attempt was made to obtain more information about the effects of pressure variation at smaller displacement

ranges and to explore the role of the range effect in the accuracy of positioning a joy-stick-type control. Four maximum pressures were used with one maximum displacement. Data for each of these four conditions were obtained in two ways. In one, the sequence of displacements was essentially random. In the other, the test subjects made a series of alignments all of the same size. It was assumed that the latter procedure would attenuate the range effect. Each of the eight subjects performed on all conditions. The results (for both series) indicate that in this task pressure variation has no effect on the accuracy of positioning responses, even with relatively short displacements. The mixed series of displacements led to the greatest error and the greatest variability at the shortest displacements within a range. With the constant series, the pattern of error was quite different, for it was not concentrated at the shortest displacements. The error also tended to be less in absolute size. The variability, however, followed a trend similar to that observed with the mixed series, although the absolute values were smaller. (Quoted in part)

3624
Weiss, H. S.,
R. Edelberg, P. V. Charland, and J. I. Rosenbaum
ANIMAL AND HUMAN REACTIONS TO RAPID TUMBLING. — Jour. Aviation Med., 25 (1): 5-22. Feb. 1954.
DLC (TL555.A1A4, v. 25)

A condensation of item nos. 2699 and 3625.

3625
Weiss, H. S.,
R. Edelberg, P. V. Charland, and J. I. Rosenbaum
THE PHYSIOLOGY OF SIMPLE TUMBLING. II. HUMAN STUDIES. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-139, Part 2, Jan. 1954. v+20 p. (RDO no. 695-61). AD 36 305
UNCLASSIFIED

In order to assess the tolerance limits to head-over-heels rotations or flat spins, as likely to be encountered in escape from aircraft, human subjects were spun on the horizontal spin-table. The experiments were guided by previous animal investigations but runs on human subjects were limited to 125 r.p.m. because of the onset of pressure pain in the head or feet. During the spin, the physiological behavior of the humans closely resembled that of the dogs and, on the basis of this, curves for the responses of humans at speeds up to 110 r.p.m. were extrapolated to the level of circulatory failure. By this procedure, it was estimated that the border line of unconsciousness would be reached after three to ten seconds of rotation at 140 r.p.m. and complete unconsciousness after three to ten seconds at 160 r.p.m. with the center of rotation at the heart. The data, together with performance tests and the observation of conjunctival petechiae, were used to determine the time-intensity areas of safe and dangerous rotations. (Authors' abstract)

3626
Welch, G. E., 1952
R. A. Bruce, W. C. Bridges, A. D. Johnson, J. H. Lehmann, and M. Nielsen
COMPARISON OF A NEW STEP TEST WITH A TREADMILL TEST FOR THE EVALUATION OF CARDIORESPIRATORY WORKING CAPACITY. — Amer. Jour. Med. Sci., 223 (6): 607-617. June 1952. DLC (R11.A5, v. 223)

The work capacity of normal subjects was evaluated by means of a new step test and compared with the results of a previously described treadmill procedure. The principles of the treadmill test are applicable to the step test, and the respiratory rate may be substituted for the respiratory efficiency in estimating the index of physical fitness. Limitations of the new step test are also discussed.

3627
Welford, A. T. 1952
THE "PSYCHOLOGICAL REFRACTORY PERIOD" AND THE TIMING OF HIGH-SPEED PERFORMANCE. A REVIEW AND A THEORY. — Brit. Jour. Psychol. (London), Gen. Sect., 43 (1): 2-19. Feb. 1952.
DLC (BF1.B7, v. 43)

Previous experiments have shown that when two stimuli requiring hand action are presented close together, the reaction time to the second is frequently longer than it is to the first. A theory was developed, that a definite organizing time is required by the central mechanisms to integrate information and initiate response to the stimulus, which is the same as the reaction time for a single response. Additional central organizing time is imposed by feedback from the type of response executed before the information from subsequent stimulus can be integrated. No two central organizing times can overlap, therefore any information has to be stored until the central mechanisms are free. This theory with certain additional assumptions can be used to explain the time relations in serial reaction time experiments, tracking, and other continuous performance tasks.

3628
Wever, E. G.,
and M. Lawrence
PHYSIOLOGICAL ACOUSTICS. — xii + 454 p. Princeton: Princeton University Press, 1954. DLC (QP461.W46)

The physiology of the normal and pathological ear is described. The anatomy of the ear and the nature of sound are also considered. (239 references)

3629
White, C. S.
THE BIOLOGICAL EFFECTS OF NOISE (SOUND). — Lovelace Foundation for Medical Education and Research, Albuquerque, New Mexico. Convair Aeromedical Consultant's Report, April 22, 1954 [14] p. AD 158 984
UNCLASSIFIED

A bibliography with supporting documents dealing with the biological effects of sound was prepared, and data on ultrasonic vibration are included. A summary of current key papers is presented. The working space noise levels specified in the handbook of instructions for aircraft designers (HIAD) for aircraft in flight are considered fair and adequate. Attention is specifically called to the noise levels now produced by existing aircraft and to the magnitude of the increase to be anticipated with jet power plants of greater thrust. The auditory and extra-auditory effects of noise are mentioned, and management is invited to carefully consider the advisability of (1) enforcing the use of ear protective gear and (2) recognizing the potential future implication of high noise fields as they relate to insurance programs and safety, the problems of public relations, plant safety, labor relations, workmen's compensation, the cost of insurance programs, and absenteeism. Data are given on hearing threshold, tolerance levels, changes in hearing threshold produced by various noise levels, the average effects of age on hearing, effects of noise on human behavior, safe allowable noise levels for long and short term exposure, allowable levels for office and other industrial spaces, noise levels desirable in cabins of commercial aircraft, the properties of ear protective equipment. The advisability of testing air-conditioning components in a preflight mockup at various altitudes for noise levels in crew spaces is pointed out. (AD abstract)

3630
White, C. S.
BIOLOGICAL TOLERANCE TO ACCELERATIVE FORCES. — Lovelace Foundation for Medical Education and Research, Albuquerque, New Mexico. Convair Aeromedical Consultant's Report, June 10, 1954. [39] p. AD 158 982
UNCLASSIFIED

Information on human tolerance to accelerative forces is compiled from

the literature and summarized in tabular and graphic form. Experimental data are discussed and deficiencies indicated. The most serious deficiency involves the lack of experimentation on combinations of g forces applied simultaneously and in a varied sequence. (AD abstract)

3631
White, C. S.
BIOLOGICAL TOLERANCE TO ACCELERATIVE FORCES. ADDENDUM I. — Lovelace Foundation for Medical Education and Research, Albuquerque, New Mexico. Convair Aeromedical Consultant's Report, June 17, 1954. [23] p. AD 158 983 UNCLASSIFIED

Data are presented graphically showing the relative g loads imposed by automobile accidents, catapults, parachute opening and landing shocks, ejection seats, and the tolerance of the human head protected with crash helmet to impact loads. The actuation of ejection seat controls, when subjects were exposed to radial g along with pitch and roll, was investigated. The effect of g loads on a man's ability to move is discussed. Forces of 3 to 4 g, when properly directed, were near the limit against which the body extremities could be moved, and which would allow progression from one point to another and prevented rising from an aircraft seat. Loads between 1 and 3 g significantly increased the time to perform a given task; e.g., donning a back-pack parachute took 17 sec. at a 1-g gravity load; time increased to 21, 41 and 75 sec. at a radial load of 1, 2, and 3 g, respectively. The task was impossible for some subjects. Difficulties with orientation and vision occurred when subjects were exposed to jostle in a radial g field. Nausea was experienced and post-exposure effects were noted for 2 hr. after a 10 min. exposure to a 1.14 resultant g force, when head movements and up and down bouncing was carried out during the exposure on the centrifuge. (AD abstract)

3632
White, C. S.
J. E. Roberts, and H. W. Merideth
THE RELATION BETWEEN DENTAL OVERBITE AND AEROTITIS MEDIA. — Jour. Aviation Med., 25 (2): 180-187. April 1954. DLC (TL555.A1A4, v. 25)
Same as item 2244.

3633
White, C. S.
THE SIGNIFICANCE OF HIGH CONCENTRATIONS OF CARBON DIOXIDE IN AVIATION MEDICINE. — In: (School Aviation Med.), Respiratory physiology in aviation, p. 159-189. Randolph Field, Tex. Sept. 1954. (Project no. 21-2301-0003). AD 49 179 PB 121739

Literature dealing with the acute toxicity of carbon dioxide in aviation medicine is reviewed. The following major aspects are discussed: (1) the relation between inspired air and partial alveolar CO_2 pressure at sea level and altitude; (2) the influence of CO_2 and the combined influence of O_2 and CO_2 on ventilation; (3) the response of subjects acclimatized to an average barometric pressure of 630 mm. to air mixtures containing from 4.1 to 9.5% CO_2; and (4) the empiricial tolerance of humans to very high, intermediate, and relatively low concentrations of CO_2 at near sea level. Estimated CO_2 time concentrations at near sea level, human tolerance to CO_2 in inspired air, in relation to time and concentration, and the toxicity of CO_2 are discussed and plotted on graphs.

3634
White, W. J.,
and S. C. Sauer
SCALE DESIGN FOR READING AT LOW BRIGHTNESS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-464, March 1954. iv+16p. (RDO no. 694-51). AD 35 201 PB 133172

This study concerns the manner in which speed and accuracy of quantita-

tive scale reading varies as a function of graduation mark width and interval size under three intensities of red illumination such as are encountered in cockpits at night. The data of the experiment consist of time and error scores obtained by different subjects, each under the same varying conditions. Graduation mark width varied from 0.008 inch to 0.063 inch and graduation intervals varied from 0.05 inch to 0.25 inch. The results of the study permit the following conclusions concerning the dimensions of scales for the visual presentation of quantitative information at the viewing distance (28 inches) and minimum night lighting conditions (.01 to .002 foot lamberts) normally found in aircraft cockpits. For optimum speed and accuracy of instrument reading (1) the distance between adjacent scale marks (graduation interval) should not fall below 0.11 inch; and (2) the width of the minor graduation marks should be approximately 0.032 inch. (Authors' abstract)

3635

Whitehead, R. W., and W. B. Draper 1953

THE PHENOMENA OF DIFFUSION RESPIRATION INCLUDING A STUDY OF THE PHYSIOLOGY AND THERAPEUTICS OF HIGH CONCENTRATIONS OF CARBON DIOXIDE. — Univ. of Colorado. Dept. of Medicine, Denver. Final Scientific Report June 15, 1946 to Dec. 31, 1952. March 25, 1953. [13] p. (Contract N6ori-131, Task Order 1). AD 17 527. UNCLASSIFIED

Thirty-two papers covering the various phases of research are briefly discussed. The topics reviewed are the effects of respiratory arrest on alveolar gases, venous and arterial blood; the hemoglobin-oxygen pump; changes in kidney function; anuria during apnea under diffusion respiration; the role of hypercapnia; the induction of respiratory arrest by procaine; the effects of thiopental sodium anesthesia; apnea induced by neuromuscular blocking agents; changes in cortical electrical activity; behavior of heart rate and blood pressure in diffusion respiration; the effects of high concentrations of CO_2 on the cerebrospinal fluid pressure; effects of various concentrations of CO_2 in O_2 on the venous pH; effects of the CO_2 on plasma volume, thiocyanate space, blood cells, and oxygen capacity; the effects of respiratory acidosis on the plasma level of thiopental and the depth of thiopental sodium anesthesia; the relationship between oxygen pressure and the survival time of dogs in diffusion respiration; and the effects of the inhalation of 20% CO_2 in O_2 on antibiotic activity of penicillin and aureomycin. (AD abstract)

3636

Whiteside, T. C. D., and F. W. Campbell 1953

ACCOMMODATION OF THE HUMAN EYE IN AN EMPTY VISUAL FIELD. — RAF Inst. of Aviation Medicine (Gt. Brit.), Farnborough, and Univ. of Glasgow. Inst. of Physiology (Gt. Brit); issued by Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 821, March 1953. 4 p.; 6 figures. AD 142 643 UNCLASSIFIED

An empty field is defined as one in which there is no cue upon which ordinary accommodation can act. A method is described for recording photographically the change in curvature of the anterior surface of the lens during accommodation. This method was employed to study the behaviour of accommodation when viewing an empty field at photopic and at scotopic levels. It is found that in an empty field of brightness 200 foot-lamberts, a mean of 0.5 diopters (5 subjects) of accommodation is involuntarily exerted. In scoptopic conditions a mean of 0.6 diopters (12 subjects) is involuntarily exerted. It is suggested that the position of rest of accommodation is not for infinity but for a distance of approximately one meter from the emmetropic eye. This "day myopia" may reduce visual efficiency in fog or in flight at high altitude. The modify-

ing effect of depth of focus upon day myopia is discussed. (Authors' summary)

3637
Whiteside, T. C. D. 1953
VISION IN AN EMPTY VISUAL FIELD: A SUBJECTIVE TECHNIQUE FOR THE MEASUREMENT OF ACCOMMODATION. — RAF Inst. of Aviation Medicine (Gt. Brit.), Farnborough; issued by Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 850, Sept. 1953. 5p; 4 figures. AD 41 106
UNCLASSIFIED

A test is described by means of which accommodation can be measured without requiring the subject to fixate any object. The test is calibrated against measurements obtained objectively with the coincidence optometer. The difference between the degrees of accommodation really exerted and the degree of accommodation expected when a test object is being observed is shown in the results. (Author's summary)

3638
Whiteside, T. C. D.,
and D. G. C. Gronow
VISION IN AN EMPTY VISUAL FIELD: THE EFFECT OF EMPTY FIELD MYOPIA UPON THE MINIMAL VISUAL ANGLE. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 872, March 1954. 14 p. AD 119 474
UNCLASSIFIED

The relationship between the minimum visual angle for a distant object and the increase in size necessary for it to be visible in spite of out-of-focus blurring introduced by involuntary accommodation during search of an empty visual field is expressed as a ratio. For 63 subjects, the mean ratio was 2.21, standard error 0.82. Graphical data are presented giving the increase in size necessary in the minimum visual angle of a collimated target so that it should remain visible in spite of out-of-focus blurring. (Authors' summary)

3639
Whitney, K. R. 1953
THE NAVAL FLIGHT SURGEON IN AIR EVACUATION. — Contact (Pensacola), 11: 36-39. 1953. DNLM

In line with the policy established by the Department of Defense, the naval flight surgeon is concerned primarily with the evacuation of casualties from forward areas such as marine land fronts, amphibious landing sites, and task forces at sea. The special problems which are often present in such situations are briefly discussed. The flight surgeon is assessed a vital role in the training of corpsmen, technicians, and nurses, both in on-the-job training in air evacuation units and in associated medical installations.

3640
Whittingham, D. G. V.
THE PROVISIONING OF EXPEDITIONS IN THE FIELD: ROYAL AIR FORCE EMERGENCY RATIONS. — Proc. Nutrition Soc. (London), 13 (1): 49-53. 1954. DLC (TX501.N9, v. 13)

Distinction is made between rations needed for emergency survival on land and on water. The former requires a high caloric content, whereas water must form the bulk of rations for survival on the ocean. At present, a compromise ration is in use which is suitable for both situations, but which favors provision for land survival. Important limitations on rations carried by aircraft are size and weight, although with the development of ejection seats capable of storing emergency rations, bulk may be increased. The question of palatability versus nutritive content is considered. The theory that rations should contain chiefly carbohydrate is tentatively rejected as a result of a feeding experiment in which two subjects were maintained on control and high-fat diets with a protein-fat-carbohydrate ratio of 1:0.9:5.7 and 1:4.5:1.4, respectively. Both diets provided 1500 calories per day, with a water intake of 1300 ml. No significant difference in physical tolerance or

psychological indices was noted between the two subjects. It was concluded that high fat and protein intake is not detrimental to health. A more palatable balanced ration, with normal carbohydrate values, is thus indicated.

3641
Whittingham, H. E.
AERO-MEDICAL PROBLEMS OF JET PASSENGER AIRCRAFT. — Jour. Aviation Med., 25 (5): 440-450. Oct. 1954. DLC (TL555.A1A4, v. 25)

A general discussion is presented of the inception and subsequent operation of jet aircraft within the British Overseas Airways Corporation (B.O.A.C.). There have been no instances of primary decompression in over 30,000 hours of Comet aircraft flight covering 12 million miles. Initially all crews selected for Comet flights were required to subject themselves to explosive decompression in a pressure chamber; however, the incidence of decompression sickness was found to be as high as 41% between the ages of 35 and 45. It was therefore decided to discontinue the decompressions as it was felt that they were an unnecessary physical strain on the older flight personnel. Aircrew selection is reviewed in light of increased work loads accompanied by demands of stress-speed conditions associated with jet flying. It is pointed out that the jet airliners had the lowest incidence of crew fatigue and sickness of any B.O.A.C. craft. Problems of glare, ultra-violet light, space myopia (due to the empty visual field at high altitudes), engine noise on the ground, and engine noise plus vibration in flight have proven to be of a minor nature in the Comet.

3642
Wied, D. de
THE INFLUENCE OF VITAMIN C ON THE GLYCOGEN CONTENT OF THE LIVER IN RATS EXPOSED TO COLD. — Acta physiologica et pharmacologica neerlandica (Amsterdam), 3 (1): 144-145. 1953. In English. DNLM

General characteristics of the adaptation curve were demonstrated in vitamin C-treated female rats exposed to a temperature of about -6°C., for 6, 12, 24, 36, 48, 60, and 72 hours. In the first 24 hours there is no appreciable difference in liver glycogen levels between the controls and vitamin C-treated animals, but a secondary rise, which attains its maximum after 48 hours in both animals, is largely completed after 36 hours in the vitamin C-treated rats. It appears that under the influence of vitamin C, the animal enters the resistance phase earlier than would otherwise be the case. It is concluded that vitamin C assists adaptation to cold.

3643
Wieland, H.
[OXYGEN AND PERVITIN AGAINST MOUNTAIN SICKNESS] Sauerstoff und Pervitin gegen Bergkrankheit. — Münchener medizinische Wochenschrift (München), 96 (42): 1228-1229. Oct. 1954. In German. DNLM

Some developments concerning the problem of oxygen lack and the use of Pervitin (1-phenyl-2-methylaminopropane) in mountain climbing are briefly reviewed. An experiment was performed to test the effectiveness of Pervitin. Rhesus monkeys were exposed to an atmosphere, the oxygen content of which was lowered until unconsciousness resulted. Control monkeys lost consciousness at an equivalent altitude of 7500 m. (8% oxygen), while monkeys injected with 1.5 mg. of Pervitin retained consciousness until an oxygen content of 5.5-6.5% (9000-10,000 M.) was reached. It is suggested that Pervitin acts by concentrating the blood in the vital organs.

3644
Wiener, M. A.
100% BELOW H_2O. — Flying Safety, 10 (11): 10-13. Nov. 1954. DLC

It has been shown experimentally that the standard aircraft oxygen equipment may be used in emergency ditching for underwater breathing, provided the

oxygen mask fits tightly and the oxygen regulator is set on 100%.

3645
Wiesinger, K.
ACHIEVEMENTS IN AVIATION MEDICINE IN SWITZERLAND DURING THE PAST TWENTY-FIVE YEARS. — Jour. Aviation Med., 25 (5): 470-472. Oct. 1954. DLC (TL555.A1A4, v. 25)

Swiss aviation medicine was founded in 1922 by Colonel Meir-Mueller; he remained in charge of the field for the Swiss government until 1946. After 1939, a rapid advance occurred in Swiss aviation medicine when the Alpine Research Laboratory was utilized for studies of the effects of moderate altitude on physiological and psychological functions in humans. Under these conditions it was possible to demonstrate a personality change in the exposed individual whereby the entire behavior pattern became more primitive and inhibited, showing signs of regression. The present aeromedical institute at Dubendorf was established in 1949 with the author as first full-time chairman. The Swiss system of selection of fighter pilots stresses psychiatric evaluation rather than the psycho-technical approach. Much work has been done on the abatement of noises peculiar to aviation and the damage to hearing which results from such noises. The transmission of electrocardiograms from airplanes through the use of standard radio equipment was developed two years ago by R. Glatt and L. Pircher; this permits an electrocardiogram to be made of the pilot under actual flight conditions. Problems of fatigue and aging in the pilot have been investigated.

3646
Wiesinger, K.
[AGING AND RETIREMENT AGE OF FIGHTER PILOTS] Vieillissement et âge de retraite des pilotes de chasse. — Médecine aéronautique (Paris), 9 (1): 33-64. 1954. In French.
DLC (TL555.M394, v. 9)

A survey of the literature covering this subject led to the following conclusions: (1) It has not been proven to this time that flying causes premature aging in fighter pilots. (2) "Aging" in fighter pilots is a psychological rather than a physiological problem. (3) Elimination of older fighter pilots from flight service is, in the majority of cases, due to eye and ear deficiencies, most of which can nowadays be eliminated or compensated for. (4) Because of great individual differences, it is not possible to establish a reasonable age limit with regard to fighter pilot activity. In practice, however, most fighter pilots are eliminated from active flight service between 35 and 40 years. (5) By enforcing greater frequency of of medical checkups, closer control on the fitness of pilots who have reached a certain age will be achieved. (6) Aeromedical research will eventually succeed in determining the individual age limits for fighter pilots.

3647
Wiggers, C. J., 1953
A. Hurlimann, and P. W. Hall
PULMONARY BLOOD FLOW AT HIGH ALTITUDES [Abstract]. — Science 117 (3044): 473. May 1, 1953.
DLC (Q1.S35, v. 117)

Several series of rebreathing experiments were carried out on dogs to determine whether there is an impediment to pulmonary circulation due to constriction of pulmonary vessels in anoxia. In the first series it was shown by changes in pressure pulses recorded simultaneously from the aorta, left atrium, and pulmonary artery that in progressive anoxia both ventricles expel more blood per beat. Since the heart also accelerates, the cardiac output per minute increases. In the second series it was shown by a flowmeter that the increase in pulmonary blood flow averages 26% during anoxia corresponding to that at 19,000 ft. altitude. In the third series it was shown that the elevation of pulmonary pressure because of greater

right ventricular output counteracts the increase in pulmonary vascular resistance and permits an increase in the pulmonary blood flow. A further series confirmed that the site of increased resistance lies beyond the alveolar capillaries. Hence, oxygenation of blood in the alveoli would not be imparied. It is concluded that cardiac stimulation by anoxia compensates to a certain extent for the decreased oxygen saturation of blood by transporting larger volumes to the tissues.

3648
Wilbanks, W. A.

A NOTE ON AN AUDITORY MOVEMENT EFFECT. — In: Naval School Aviation Med. , Miscellaneous tests and minor evaluations, p. 54-57. Pensacola, Fla. Oct. 20, 1954. (Project Report no. NM 001 058.25.29). AD 55 782(k)
UNCLASSIFIED

A discussion is given of the auditory movement effect reportedly observed by subjects at delays below the threshold for sidedness (displacements of 106 to 212 c.p.s. with interaural time difference up to 10 millisec.) when extreme interaural intensity differences were presented. The noise was first audible on the more intense side and then moved suddenly through the head to the ear leading in time and remained there. This observed movement is regarded as phenomenally genuine; the conditions of proximal stimulation assumed to be uniquely correlated with preceived auditory movement are lacking. (AD abstract)

3649
Wilbanks, W. A.

A TECHNIQUE FOR RAPID GROUP TESTING OF ABSOLUTE AND DIFFERENCE INTENSITY THRESHOLDS FOR TONES. — In: Naval School Aviation Med., Miscellaneous tests and minor evaluations, p. 48-53. Pensacola, Fla. Oct. 20, 1954. (Project Report no. NM 001 058.25.28). AD 55 782(j)
UNCLASSIFIED

Procedures are described for use in the rapid determination of both absolute and differential auditory thresholds of personnel in group testing situations. The basic procedure for determining the absolute thresholds by the method of limits consists of a serial-order presentation of stimulus values in descending and/or ascending series. One feature of the present modification of this basic technique is that the observers are not asked to judge whether a single tone is audible but whether a tone is continuous or interrupted; only a descending series is used. In determining difference thresholds, the listener judges whether the second of a pair of stimuli is louder, equal to, or softer than the first. A block diagram of the apparatus to be used for threshold measurement is given, and the methods for computing the thresholds are described. The techniques are considered to be accurate for screening personnel with serious hearing loss and to be suitable for both group and individual testing. (AD abstract)

3650
Wilcox, L. R., and E. L. Cole 1952

THE EFFECTS OF TWO INSTRUMENT LIGHTING SYSTEMS ON DARK ADAPTATION. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 52-263, Dec 1952. iv + 15 p. (RDO no. 694-41). AD 5006
PB 109408

Four pilots with normal vision were tested for the effects of the standard indirect red and red-flood aircraft instrument lighting systems on dark adaptation. Data were gathered in a completely blacked-out cockpit while the aircraft was in a hangar and also during conditions of normal night flight. Significant differences in dark adaptation thresholds were found between the hangar and flight phases and between the low and high levels of light intensity used. No significant differences were found between the types of lighting systems used. It is concluded that the flight

conditions of starlit night sky affect dark adaptation levels to a significant degree. (Authors' abstract)

3651
Wilcoxon, H. C.,
E. Davy, and J. C. Webster
EVALUATION OF THE SNJ OPERATIONAL FLIGHT TRAINER. — Psychological Corp., New York (Contract N9onr-99902); issued by Office of Naval Research. Special Devices Center, Port Washington, N. Y. Technical Report no. SPECDEVCEN 999-2-1, March 22, 1954. vi+87 p. AD 86 988
UNCLASSIFIED

An experimental evaluation of the SNJ OFT (a high fidelity electronic trainer which simulates the SNJ, a low performance, dual-control naval air training aircraft) includes determination of the amount of transfer of training, the improved utilization techniques obtained, and the investigation of the design characteristics of the operational flight trainers. A modified training sequence in basic instrument and radio navigation was compared with the standard procedure. Four separate studies were conducted. In each, one or more experimental groups of students were trained with equipment or a syllabus differing from that of a control group. The effectiveness of training for each group was determined, with such indexes as proficiency in the trainer and in the plane, written test scores, and time required to complete the unit of training. Student performance showed that synthetic flight trainers contributed to basic instrument training. The low-fidelity NavBIT (standard Navy synthetic trainer) was equal to the specialized SNJ in effectiveness for basic training and was slightly superior for radio training. Synthetic training in a single block was as effective and less time consuming than when alternated with actual flight. Cockpit familiarization training was as effective with a combination of SNJ cockpit mockup and cycloramic Link trainer as with the SNJ OFT. (AD abstract, modified)

3652
Wilcoxon, H. C.,
and E. Davy
FIDELITY OF SIMULATION IN OPERATIONAL FLIGHT TRAINERS. PART I. EFFECTIVENESS OF ROUGH AIR SIMULATION. — The Psychological Corp., N. Y. (Contract N9onr 99902, SPECDEVCEN Project 20-L-4); issued by Office of Naval Research. Special Devices Center, Port Washington, N. Y. Technical Report SPECDEVCEN 999-2-3a, Jan. 25, 1954. 8 p. AD 140 998.
UNCLASSIFIED

An experimental investigation of the effectiveness of rough air simulation in basic instrument and radio range procedure training is described. The movement produced by rough air simulation seems to add realism to the synthetic training situation and result in a more favorable student attitude toward the training device. However, the rough air simulation does not appear to result in higher proficiency either in the synthetic trainer or in the SNJ aircraft. The authors suggest that the inclusion of this unit in the trainer does not seem necessary, although it may be justified on the grounds of contributing to "face validity".

3653
Wilcoxon, H. C.
and E. Davy
FIDELITY OF SIMULATION IN OPERATIONAL FLIGHT TRAINERS. PART II. THE EFFECT OF VARIATIONS IN CONTROL LOADINGS ON THE TRAINING VALUE OF THE SNJ OFT. — The Psychological Corp., New York (Contract N9onr 99902, SPECDEVCEN Project 20-L-4); issued by Office of Naval Research, Special Devices Center, Port Washington, N. Y. Technical Report SPECDEVCEN no. 999-2-3b, Jan. 25, 1954. [9]p. AD 204 917.
UNCLASSIFIED

The effects of gross variations in control loadings upon the effectiveness of the SNJ OFT in basic instrument training were investigated. The major

finding in this study is that, for the purpose of teaching basic instrument skill in the SNJ aircraft, the control loadings of the SNJ OFT may be varied over a wide range without affecting the training value of the device. Fidelity of pressure does not seem to be an important factor in this kind of training.

3654
Wilcoxon, H. C.,
and J. C. Webster
SURVEY OF UTILIZATION OF FLEET-TYPE OPERATIONAL FLIGHT TRAINERS. — The Psychological Corp., New York (Contract N9onr 99902); issued by Office of Naval Research. Special Devices Center, Port Washington, N. Y. Technical Report SPECDEVCEN 999-2-2, March 15, 1954. iv + 34 p. (SPECDEVCEN Project 20-A-14). AD 133 265 UNCLASSIFIED

This study investigates the use to which simulators have been put, with particular emphasis on the relation between training needs and the appropriateness of the design characteristics of the trainers. It was found that the amount of utilization of the trainers varied widely; the extent to which several training models were employed is outlined. Two equally important conclusions are made in regard to trainer utilization: (1) the training device should be designed to meet specific training needs, and the degree of simulation of the aircraft characteristics should be determined by the nature of these needs; and (2) close liaison is necessary between the synthetic training unit and the squadron to insure that maximum use is made of available training aids.

3655
Wilkins, H.
FOOD PROBLEMS IN EXPLORING THE ARCTIC. — In: Spector, H., and M. S. Peterson, (ed.), Nutrition under climatic stress..., p. 102-107. Nat. Acad. of Sci.—Nat. Research Council and Advisory Board on Quartermaster Research and Development, Washington, D. C., May 1954. AD 67 453 PB 117996

The nutritional problems in the Arctic arising from habituation to certain food likes and dislikes of men are discussed, particularly in reference to fats. Several means of overcoming these attitudes are proposed. Daily diet and meal schedules for the most efficient performance in the Arctic are outlined.

3656
Wilkins, W. L.,
and M. K. Rigby
A COMPARISON BETWEEN MILITARILY ORIENTED AND CLINICALLY ORIENTED APPROACHES TO THE DEFINITION OF SELECTION PROBLEMS [Abstract]. — Amer. Psychologist, 9 (8): 493-494. Aug. 1954.
DLC (BF1.A55, v. 9)

As an approach to the problem of securing better congruence between psychologists and the military officers on the definition of crucial behavioral characteristics, the present research reports results in one such situation, the assessment of characteristics of enlisted men being screened in an active program of selection for commissioned officers. Forty behavioral characteristics, presumably significant for success as a company grade officer, were divided into two lists and put into language as specific as possible. Both lists were independently ranked by 15 Marine Corps officers experienced in combat and in screening and by 15 psychiatrists and psychologists, experienced in screening work. Correlation between Marine Corps and medicopsychological ranks was .86 for one list of behaviors, and .94 for a second, suggesting that when crucial behaviors are expressed in terms, not of traits or attributes, but of behaviors, there can be considerable agreement on what is relevant to the particular assessment situation. Areas of agreement and of disagreement are discussed with possible implications for research workers and those who put research results into operation in military personnel situations. (Quoted in part)

3657
Wilks, S. S.

REACTIONS OF NORMAL, ALTITUDE-ACCLIMATIZED AND CO-ACCLIMATIZED ANIMALS TO LOCAL INJECTIONS OF PURE CARBON MONOXIDE GAS. — Federation Proceedings, 13 (1^{I}): 165. 1954. DLC (QH301. F37, v. 13)

Mammals can tolerate large quantities of carbon monoxide in the peritoneal cavity while breathing air. The changes which occur subsequent to the injection of the CO provide an interesting study in the CO-oxygen equilibrium. Following the CO injection there is a rapid rise of P_{O_2} and P_{CO_2} in the cavity. After a period of 3-4 hr. the oxygen tension will be between 200 and 300 mm. Hg and the P_{CO_2} will quickly rise and maintain a value of approximately 40 mm. Hg. In animals acclimatized to CO and altitude the oxygen pressure in the cavity persists longer than in the cavities of control animals. (From the author's summary)

3658
Wilks, S. S.,
and J. F. Tomashefski

RESULTS OF IN-FLIGHT TESTING OF SAM PORTABLE RESPIRATOR ON POLIOMYELITIC PATIENTS. — Jour. Aviation Med., 25 (3): 265-274. June 1954. DLC (TL555.A1A4, v. 25)

A light weight full-body respirator has been constructed at the School of Aviation Medicine. The respirator has been tested on both hospital-confined and airborne apneic patients and has been found to provide adequate ventilation and comfort. It may be used as an emergency unit.

3659
Winder, C. L.,
and K. R. Wurtz

SOME EFFECTS OF INDUCED SUCCESS AND FAILURE ON JUDGMENT BEHAVIOR. — Stanford Univ. Dept. of Psychology, Stanford, Calif. Technical Report no. 5, Aug. 31, 1954. iii+22+2 p. (Contract Nonr 225(01)). AD 40 189
PB 117890

A study was made of the effect of success or failure in a judgment task on subsequent judgment behavior as measured by speed, confidence, and stability of choice. Two experiments were involved, and each included two types of task: a judgment of word associations involving judgments based on the subject's experience and not on any immediate stimulus material, and an objective-type judgment task involving judgments about directly observed stimulus materials. On the first task the individuals who were told that they performed above average in accuracy showed increases in speed, confidence, and stability of judgment on repetitions of the task. The effects of success were greater than those of failure. The fact that failure resulted in some increases in confidence and stability was explained by the fact that an over-all performance included success on some elements. Increased confidence resulting from being told of success was noted on the second task in the second experiment. (AD abstract)

3660
Winder, C. L.,
and K. R. Wurtz

A STUDY OF SOME PERSONALITY CORRELATES OF JUDGMENT BEHAVIOR. — Stanford Univ. Dept. of Psycology, Stanford, Calif. Technical Report no. 6, Aug. 31, 1954. iii+20+2 p. (Contract Nonr 225(01)). AD 40 190
PB 117891

A study was made of the relationship between dimensions of speed and confidence of judgment on a psychophysical linear discrimination task and personality characteristics as determined by responses on the Minnesota Multiphasic Personality Inventory (MMPI) and the Adjective Check List. A total of 64 male volunteers were divided into a fast and a slow group on the basis of over-all judgment speed on the psychophysical test. Tentative results indicated that the fast group was the more impulsive and less conventional group and was overproductive in thought and action as com-

pared with the slow group. The fast group also checked more adjectives as being descriptive of themselves than did the slow group; the items which were checked differentially suggested that the subjects of the fast group were more active and lazy, self-centered, and expansive in inter-personal relationships. The subjects were also divided into high, warranted, and low confidence groups. The MMPI failed to differentiate the high and warranted confidence groups, but the low group was revealed as rather anxious, introspective, and concerned with problems. The findings from the Adjective Check List agreed with the MMPI findings for the low confidence group. (AD abstract)

3661

Winston, J., 1952
and J. Sataloff

FURTHER CLINICAL INVESTIGATION ON THE EFFECT OF DRAMAMINE UPON COCHLEAR FUNCTION. — Annals Otol. Rhinol. and Laryngol., 61 (2): 350-351. June 1952.

DLC (RF1.A6, v. 61)

Audiograms were taken of 46 normal subjects before and one hour after oral administration of dramamine (100 mg.). A third audiogram was made two hours after administration. In no instance was there observed any change in hearing.

3662

Wit, G. de

[TEST OF SEA-SICKNESS] Keuring op zeeziekte. — Nederlands militair geneeskundig tijdschrift (Den Haag), 7 (8): 178-191. 1954. In Dutch.

DLC (RC971.N4, v. 7)

Experimental evidence indicates that in man as well as in animals, motion sickness is primarily of organic origin with psychological factors playing a secondary role. Prediction of motion-sickness proneness is increasingly possible by the use of parallel swings and by cupulometry. The former method is still in the experimental stage, but cupulometry is well suited for routine examinations. The value of the threshold in the cupulogram indicates the sensitivity of the peripheral vestibular apparatus, and the steepness of the curve is primarily a function of central factors. Examination of 120 subjects by both tests resulted in the distinguishing of two types of motion-sickness: (1) permanently motion-sickness-prone subjects who cannot become adapted to vestibular stimulation as indicated by steep slopes of the cupulogram in repeated testing, and (2) subjects with a non-specific type of motion-sickness which is chiefly due to a latent Menière's syndrome (with a history of cerebral concussion) and/or who have experienced malnutrition (lack of the pellagra-preventive factor in particular). On the basis of these findings a testing procedure was developed to predict the permanently motion-sickness-prone individual. Administration of this battery to 10 subjects exhibiting the most severe symptoms of seasickness from a group of 284 cadets on their first sea trip, resulted in classifying five as permanent. No deviations were noted in six symptomless controls from the same group.

3663

Woessner, B. L.

EFFECTS OF STRESS AND DISPLAY-CONTROL RELATIONSHIPS ON RESPONSE DISCRIMINATION. — Univ. of Maryland, College Park. Technical Report no. 21, Feb. 26, 1954. 71 p., 4 plates. (Contract DA-49-007-MD-222 (O.I. 19-52)). AD 30 780

UNCLASSIFIED

Studies were designed to determine the effects of task-induced stress on performance. The interaction of the three components of stress (motivation, cognitive concomitants, and affective concomitants) was considered to determine the particular performance manifestations found in any investigation. Sensori-motor tasks were used. Task-induced stress was induced by (1) making the task so difficult that its solution was impossible or very difficult or (2) reporting false failure scores to the

subjects during or subsequent to the testing sessions. Some of the stressing variables used were speed stress, display-controls stress, stress due to monotony, and stress due to the spatially unpredictable occurrence of successive signals. Results indicated that speed-stress and display-control stress conditions affected over-all performance on a vigilance type of sensori-motor task where response discriminations to the spatially unpredictable occurrence of successive signals were required. As measured by response discrimination of the task employed, certain portions of the stimulus field were attended to with a greater degree of alertness than were other portions. Display-control stress conditions also differentially affected performance. Speed-stress conditions differentially affected performance stability over a given testing period. The stressing variables caused no significant shift attentional regard as measured in terms of the precision of response discrimination of the sensori-motor tasks. (AD abstract)

3664
Wolff, W. M.
CERTAINTY: GENERALITY AND RELATION TO MANIFEST ANXIETY. — Stanford Univ. Dept. of Psychology, Calif. Technical Report no. 3, May 1, 1954. ii+13+2 p. (Contract Nonr 225 (01)). AD 35 053 PB 117207

An investigation was made to determine (1) the generality among some measures of certainty and (2) the relationship of some certainty measures to a measure of manifest anxiety. Subjective certainty refers to the degree of conviction experienced consciously by any given subject. Behavioral certainty refers to amount of information requested by subjects before making choices. Sixty female students performed three tasks which yielded measures of subjective certainty. In general, the findings offered no, or very slight, evidence for any generality to certainty as measured, and offered only partial support for the expected inverse relationships between the measures of certainty and an inventory measure of manifest anxiety. (AD abstract)

3665
Wulfften Palthe, P. M. van
[BIOLOGICAL ASPECTS OF ELECTROENCEPHALOGRAPHY] Biologische aspecten van de Electro-encephalografie. — Aeromedica acta (Soesterberg, Netherlands), 3: 71-96. 1954. In Dutch DNLM

Changes in cerebral energy release produce modifications in electroencephalographic base rhythm. By means of the autonomic nervous system and the subcortical pathways, cerebral metabolism is modified by cerebral blood composition and circulation, changes in inspired CO_2 and O_2 levels, altered blood glucose levels, and mental conditions (attention, mental relaxation, alarm, fluctuations of conscience, somnolence, sleep and wakefulness). This metabolic modification manifests itself in cerebral electrogenesis and reverberates on the cortex. In addition, intermittent photo-stimulation affects EEG. Electroencephalography is incapable of showing the direct mechanism of intellectual functions, emotions, and fluctuations of conscience. The degree of activity of these psychisms is reflected only in the EEG as related to the energy process. Based on EEG changes, the authors indirectly conclude the existence or non-existence and the intermediate states of mental disorders. In order to evaluate electroencephalograms in pathological cases and to judge the deviations encountered, it is necessary to know the changes of base rhythm that normal subjects present.

3666
Wulfften Palthe, P. M. van
[THE HISTORY OF AVIATION MEDICINE IN THE NETHERLANDS] De geschiedenis der Luchtvaartgeneeskunde in Nederland. — Aeromedica acta (Soesterberg, Netherlands) 3: 17-23. 1954. In Dutch. DNLM

Progress in aviation medicine in the Netherlands is essentially due to a few researchers. In 1920 a report was published recommending the establishment of a central institute, which would set up a testing program for all civilian and military aviation candidates, carry out periodic physical examinations for pilots, take charge of scientific research in the field of aviation medicine, and supervise the testing of safety devices. This institute, however, would not replace the aeromedical activities in the Air Force and Navy. The recommendation of 1920 was realized when the National Luchtvaartgeneeskundig Centrum (National Aeromedical Center) was created. It coordinates cooperative research and makes a valuable contribution toward keeping medicine in step with progressing aviation technology.

3667
Wulfften Palthe, P. M. van
MEDICAL TESTS FOR DETECTING LATENT EPILEPSY AND FLUCTUATIONS IN THE LEVEL OF CONSCIOUSNESS. — Jour. Aviation Med., 25 (3): 275-283-303. June 1954.
DLC (TL555.A1A4, v. 25)

An evaluation of the Wiersma stipple sheet as a diagnostic aid in detecting latent epilepsy is presented. The test sheet consists of 50 consecutive lines; in each line is included the same number of 3, 4, and 5-stipple patterns. Commencing at the top left of the sheet, the subject must cross out all 4's, working continuously down the page, taking each line in order from left to right. The results are graded on the basis of time per line, total time, number of mistakes and omissions, and the spreading of times for each line (dispersion). Epileptic and hysterical subjects show extreme deviations from the normal response pattern. Hysterics produce a great number of mistakes and omissions, but the dispersion curve is normal. Epileptics show a wide spread of times per line (believed to be due to brief attacks) and increased total times, but few omissions or mistakes. This test is effective in detecting hypoxia and alcohol-intoxication; it has been proved effective in helping to select successful pilot-candidates. Lowering of the level of consciousness due to a drop in blood sugar is also detectable by the test. The author proposes the hypothesis that the pattern sequence of the 4's in the test itself can inducing a lowering of consciousness which must be considered in the final test results.

3668
Wulfften Palthe, P. M. van
[NEUROPHYSIOLOGICAL ASPECTS OF FATIGUE] Neuro-physiologische aspecten der vermoeidheid. — Aeromedica acta (Soesterberg, Netherlands) 3: 25-39. 1954. In Dutch. DNLM

Current emphasis on flying stress and flying fatigue has led to the development of a systematic research program carried out at the National Luchtvaartgeneeskundig Centrum to explore these still vaguely defined concepts. Among the causative factors the following are prominent: physical and mental exertion, monotony, oxygen deprivation, changes in atmospheric pressure, and intermittent light, sound, or proprioceptive stimuli. A distinction must be made between the mere sensation of fatigue and actual fatigue, i.e., primarily, muscle fatigue resulting from sustained muscular tension and proprioceptive and vestibular reflexes governing posture and equilibrium. Also, extended periods of mental concentration, high levels of consciousness and attention produce an increase in muscle tension and lead to decrements in complex mental functions. First affected by fatigue is the complex function of "anticipation", which is of paramount importance in flying. A substantial number of flying accidents may be attributed to deterioration of mental functions due to fatigue. Loss of mental functions can be measured to some extent by the Bourdon-Wiersma (Stipple) test, by the three-bar (driestaafjes) apparatus, and by determining

critical flicker fusion frequency or sensitivity to inhalation of air-CO_2 mixtures. In addition, emotional disturbances or the effects of sudden wind gusts on the upper lip may induce hyper- or hypoventilation, which, in turn, may lower the consciousness level and increase fatigue. A few measures are proposed to counteract fatigue, such as: (1) installation of wire recorders to play at irregular intervals; (2) wearing of blue-colored glasses with side pieces to lower the intensity of intermittent light stimuli both centrally and peripherally, and (3) eating of food rich in sugar at intervals, since hyperglycemia counteracts fatigue. Amphetamines cannot be recommended as a therapeutic measure. Once a certain stage of fatigue is reached, nothing can counteract it, except rest and sleep.

3669
Wulfften Palthe, P. M. van
REMARKS ON PSYCHOLOGICAL AND PSYCHIATRIC METHODS OF SELECTION AND ASSESSMENT OF FLYING PERSONNEL. — Aeromedica acta (Soesterberg, Netherlands) 3: 41-44. 1954. In English. DNLM

At present candidates for the Air Forces of the Dutch Army and Navy are psychologically tested by a selection committee with emphasis on selecting the best candidate rather than sifting out the unfit. Civil aviation candidates are pre-selected by undergoing a psychological testing. Final acceptance or rejection is made on the basis of achievement reports and of a personal interview after a short period of flight training. However, when the demand exceeds the available man power, the selection procedures change from selection of the best to elimination of the clearly unfit. Such screening can be best undertaken in a specialized aero-medical institute. A candidate would receive, in addition to the psychological and medical examination, a period of training in flying or gliding. Present-day aviation offers opportunities to all physically and mentally normal individuals meeting certain minimum requirements. International cooperation will aid in making full use of man power. The current NATO policy of inducing certain countries to specialize in one type of flying only, is disadvantageous since it limits utilization of the total available man power.

3670
Wulfften Palthe, P. M. van, and J. T. H. van Weeren
THE STIPPLE TEST. — Aeromedica acta (Soesterberg, Netherlands), 3: 127-138. 1954. In English. DNLM

The stipple test, which was originally used to differentiate clinically between hysteria and epilepsy, has been incorporated as an indicator of concentration in routine examinations of pilot candidates at the Dutch National Aeromedical Center. Besides revealing latent epilepsy, the test reveals other trends in personality structure. It is carried out as follows: the subject scans a page of grouped dots in accordance with a standardized set of instructions, marking every group of four dots. The examiner times the test and watches the subject's behavior while working on it. Then the test sheet is converted into a graph and curves are drawn of accomplishment times and time dispersion. Restandardization of the test on a population of 1,250 aviation applicants and pilots showed a significant deviation in dispersion breadth from the original Godefroy control group. A detailed analysis of the frequency distribution diagram of Bourdon test figures for the above population is included. The over-all average was found to be 60, with scores below regarded as unfavorable. The Chi^2 on correlation of Selection Board ratings with Bourdon figures was found significant in a randomly selected group of 500 aviation candidates. The value of the Bourdon test as a predictor of success of initial training was found in the same sample to correlate 0.43 at a 0.01 level of significance, whereas the Selection Board evaluation had a correlation coefficient of 0.25, at 0.05 level of significance. On the basis of

success or failure of candidates, conclusions reached about Bourdon versus Selection Board, were that predictive value for both is approximately equal and neither may serve alone as a basis of rejection of candidates.

3671
Wünsche, O.
[AVIATION MEDICINE AS A TASK OF SPORTS MEDICINE Luftfahrtmedizin als sportärztliche Aufgabe. — Deutsche medizinische Wochenschrift (Stuttgart), 79 (20): 823-824. May 14, 1954. In German. DNLM

A general review of the various fields of research which are of concern to aviation medicine is presented and parallels are drawn between the tasks, ethics, and goals of sports medicine and aviation medicine.

3672
Wyeth, J.,
P. Ecker, and B. D. Polis
SPECTROPHOTOMETRIC DETERMINATION OF BLOOD OXYGEN SATURATION. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5408, July 16, 1954. iii + 14 p. (Project Report no. NM 001 060.03.06). AD 37 152 UNCLASSIFIED

A spectrophotometric method for determining blood oxygen saturation compared favorably with the Van Slyke method and is proposed as an alternate analytical technique. Less time and sample volume are required for the analyses. Triton X-100 was used as a hemolytic agent. The method permits the measurement of absorbancies in the near infrared for the determination of blood oxygen saturation. The procedure makes possible the analysis of arteriovenous oxygen differences with sufficient accuracy to permit the calculation of cerebral metabolic oxygen consumption in cerebral blood flow procedures. The spectrophotometric determination of oxyhemoglobin is dependent on the solution of the simple simultaneous equations given. A description of the apparatus, the spectrophotometric constants, a table of comparative results of both methods, and a curve showing the correlation between the two methods are included. (AD abstract)

3673
Wyndham, C. H.,
N. B. Strydom, J. F. Morrison, F. D. DuToit, and J. G. Kraan
A NEW METHOD OF ACCLIMATIZATION TO HEAT. — Arbeitsphysiologie (Berlin), 15 (5): 373-382. 1954. In English. DNLM

This is a report on additional experiments of acclimatization to heat by the Transvaal Chamber of Mines Two-Stage Method of Acclimatization, see item nos. 3516 and 3674. The advantages of the use of this method for the mining industry are discussed with reference to morale, health, and economic problems.

3674
Wyndham, C. H.,
N. B. Strydom, J. F. Morrison, F. D. DuToit, and J. G. Kraan
A NEW METHOD OF ACCLIMATIZATION TO HEAT [Abstract]. — South African Jour. Med. Sci. (Johannesburg), 19 (4): 171. Dec. 1954.
DLC (R98.S6, v. 19)

A new method of acclimatization, described by N. B. Strydom (item no. 3516) was tested in a field trial, using 110 laborers. The men were exposed to the same rate of work as fully acclimatized men, but worked in mild heat (86.5°F.) for 6 days. This period was followed by 6 days of work (shoveling rock in a mine) in severe heat (91.5°F.). Rectal temperatures were measured at 7, 8, 11 and 1 o'clock on each working day. The mean rectal temperature fell from 101.0°F. on the first day to 100.0°F. on the twelfth day. Moreover, a partial state of acclimatization was produced during the first week as indicated by the fact that the mean temperature was lower (100.8°F.) on the first day in the hot stope than

on the first day in the cool stope (101.0°F.). Only on the first and second days did the mean body temperature of 40 complete novices significantly exceed that of 70 men returning for the second or third time. There were 23 cases of laborers with occasional rectal temperatures in excess of 103.0°F. Most of these cases could be attributed to illness. Some occurred during the first two critical days of adaptation or in association with excessively hard work. It was concluded that this method of acclimatization is effective in producing adequate physiological adjustment and a satisfactory rate of work. (Abstract, modified)

3675
Wyndham, C. H.,
N. B. Strydom, J. F. Morrison, F. D. DuToit, and J. G. Kraan
RESPONSES OF UNACCLIMATIZED MEN UNDER STRESS OF HEAT AND WORK. — Jour. Applied Physiol., 6 (11): 681-686. May 1954.
DLC (QP1.J72, v. 6)

For reasons of comparison with a previously published study on the responses of trained and heat-acclimatized men working under various heat stress conditions, 343 unacclimatized recruits were subjected in small groups to work under 43 different combinations of heat stress conditions. The heat stress consisted of air temperatures ranging from 84-96°F, at 100% humidity. Also, the work rates and the wind velocities were varied in relation to each other and to the air temperature. During work, rectal temperatures of raw recruits rose to new equilibrium levels which were closely related to the rate of work and, within certain air temperature ranges, uninfluenced by changes in wind-velocity. During rest and during work at various degrees of environmental heat stress, the level of rectal temperatures of raw recruits was uniformly higher (1.3°F.) than that of acclimatized men. Thus, acclimatization confers an advantage of 3-6°F. in saturated air temperature before rectal temperatures of acclimatized men approximate those of raw recruits. Also, the sweat rates of raw recruits were generally higher except under severe heat stress conditions when they fell below those of acclimatized men. Heart rates of recruits were greater throughout all combinations of heat stress. These differences in responses of raw and acclimatized men, when exposed to various degrees of heat stress, can be explained by the more sensitive setting of the thermostatic control of sweating by the central thermosensitive centers. (Authors' summary, modified)

3676
Wyndham, C. H.,
N. B. Strydom, J. F. Morrison, F. D. DuToit, and J. G. Kraan
THERMAL RESPONSES OF MEN WITH HIGH INITIAL TEMPERATURES TO THE STRESS OF HEAT AND WORK. — Jour. Applied Physiol. 6 (11): 687-690. May 1954. DLC (QP1.J72, v. 6)

In connection with a previous larger study (cf. item no. 3675), an investigation was made on thirty-seven unacclimatized mining recruits, who reported with mild medical complaints and above-average body temperatures. Under medical supervision these men were subjected to the stress of exercise in cool or hot humid environments. The results were subjected to statistical analysis. It was shown that unacclimatized men with symptoms of mild illness and rectal temperatures above 100°F. readily attain rectal temperatures of 104°F. under conditions of moderate and severe heat stress. Most men were distressed at such rectal temperatures. The conclusion was reached that it is possible, on the basis of initial resting rectal temperatures, to predict which man will develop the highest rectal temperatures during work in hot conditions. (Authors' summary, modified)

3677
Wynn-Parry, C. B.
SOME ASPECTS OF REHABILITATION

IN THE ROYAL AIR FORCE. — Proc. Roy. Soc. Med. (London), 47 (3): 159-162. March 1954. DLC (R35.R7, v. 47)

Some of the results obtained in the residential rehabilitation centers of the Royal Air Force are presented with statistical data giving the type of injury, days spent in the hospital, days spent in the rehabilitation center, and degree of recovery. Short-term cases and long-term cases are discussed separately.

3678
Wyss-Dunant, E. 1953
[CONTRIBUTION TO THE PATHOLOGY OF ALTITUDE] Contribution à la pathologie d'altitude. — Revue du praticien (Paris), 3 (19): 1387. July 1, 1953. In French. DNLM

Observations are made on the phenomena of altitude acclimatization and adaptation, and the distinguishing features of each are briefly discussed. The age of the individual is reflected in the manner in which he reacts to or tolerates various altitudes. Studies of these reactions and tolerances permit the selection of those individuals best suited for Alpine or Himalayan expeditions.

3679
Wyss-Dunant, E. 1953
[THE OXYGEN GENERATOR USED BY THE FIRST SWISS EXPEDITION TO EVEREST IN 1952] Le générateur à oxygène utilisé par la 1re expédition suisse à l'Everest en 1952. — Bulletin der schweizerischen Akademie der medizinischen Wisenschaften (Basel), 9 (3-4): 221-229. Sept. 1953. In French, with English summary (p. 229). DNLM

The materials of construction and the valve systems of the closed circuit oxygen apparatus used by the Swiss in their assault on Mt. Everest in 1952 are described. The apparatus weighs 2 1/4 kg. and needs neither a mask nor a system of tubes, thus reducing the dead space and total weight to a minimum. The continuous respiration generator has an operating capacity of about 45 min. The apparatus, in contrast to the open air circuit with bottles, is light equipment and is best suited for altitudes above 8,000 meters. (Author's summary, modified)

3680
Wyss-Dunant, E.
[ACCLIMATIZATION SHOCK: OBSERVATIONS IN THE HIMALAYAS] Le shock d'acclimatation: observations à l'Himalaya. — Praxis (Berne), 43 (39): 825-836. Sept. 30, 1954. In French. DNLM

Same as item no. 2286, vol. 2.

3681
Yagoda, H.,
and Howard B. Smith
OBSERVATIONS ON THE PENETRATION OF A HEAVY PRIMARY THROUGH TISSUE. — Jour. Aviation Med., 25 (1): 46-49, 66. Feb. 1954. DLC (TL555.A1A4, v. 25)

Nuclear emulsions were used to study the penetration of heavy primaries of cosmic radiation through organic structures. These emulsions contained bits of embedded tissue ("artifacts") in the emulsion gel. An example is described in which the track of a heavy primary penetrated through an embedded tissue and then came to rest in the emulsion. The track was recorded in an Illford G5 unsupported emulsion sheet, 1500 microns thick, flown in a Skyhook balloon at an altitude of 95,000 feet. The tissue was penetrated at a distance of 3,650 microns from the end of the particle range and with an energy of 860 mev. For purposes of evaluating energy loss, it was assumed that the particle was a stripped carbon nucleus which lost energy at the rate of 30,000 ion pairs per 10 microns of tissue as it entered the artifact and traversed it for approximately 7 microns. Ionization levels of this magnitude can be expected to produce breakage of chromosome linkages.

3682
Yarcho, W. B.
PARACHUTE JUMP TESTS CONDUCTED ON THE USN EXPERIMENTAL MARK III LIFE PRESERVER. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Memorandum Report no. WCRD 54-10, Jan. 15, 1954. 5 p. (Project no. R-670-417). AD 29 926 UNCLASSIFIED

Six subjects, each equipped with a Mark IV exposure suit, a Mark III life preserver, a seat- or back-type parachute, an auxiliary chest pack, a Class-III (quick-release canopy) parachute harness, and a back- or seat-type survival kit containing a one-man dinghy, accomplished the tests. The life preserver was worn beneath the parachute harness. The test procedure was as follows: open parachute, pull lanyard to open survival kit and inflate dinghy, disengage chest-parachute pack, loosen and unsnap parachute-harness chest strap, inflate life preserver, release parachute canopy upon contact with water, and board dinghy. The life preserver impeded boarding of the dinghy; incomplete inflation of the dinghies may have aggravated this problem. Inflation of the life preserver did not tend to force the subjects from the parachute harness. Preserver flotation was generally satisfactory, but was unnecessary for conscious and active individuals since the exposure suit provided adequate buoyancy. The inflated preserver interfered with canopy release, parachute-harness removal, and general movement in water and in the dinghy. Two inadequate mechanical inflations of the preserver were caused by leakage from a damaged flotation cell in one case and the restraining action of the parachute-harness straps in the other case. Additional dinghy-boarding tests are recommended. (AD abstract)

3683
Yu, P. N. G., and A. Soffer 1952
STUDIES OF ELECTROCARDIOGRAPHIC CHANGES DURING EXERCISE (MODIFIED DOUBLE TWO-STEP TEST). — Circulation, 6 (2): 183-192. Aug. 1952. DLC (RC681.A1C5, v. 6)

A method of recording electrocardiograms during performance of a double two-step exercise test is described. Data obtained from 32 normal subjects and 54 patients are analyzed, and changes in heart rate, S-T segment, T wave and Q-T interval and the occurrence of premature beats are described. Criteria for an abnormal response indicating coronary insufficiency are defined. This method retains the merits of Master's original test, and, in addition, has several distinct advantages. (Authors' abstract).

3684
Zajac, J. L. 1953
INVESTIGATIONS ON DEPTH PERCEPTION IN INDIRECT VISION. — Brit. Jour. Psychol. (London), Gen. Sect., 44 (2): 132-144. May 1953. DLC (BF1.B7, v. 44)

Experiments investigating the relation between depth perception and changes of fixation point for indirect monocular vision and binocular vision with double images and the influence of color on depth gave the following general results: (1) Objects viewed in indirect vision through different color filters are seen at different distances from the eyes. This phenomenon was observed both in the case of monocular vision, and in binocular vision with double images. (2) A relation seems to exist between depth perception and wavelength of light. Objects are seen as nearer with longer wave-lengths and as farther away with shorter wave lengths of light. (Author's summary, modified)

3685
Zeller, V. M.
FRENCH AIRBORNE NURSE VISITS FLIGHT NURSE SCHOOL. — Military Surgeon, 115 (4): 287-288. Oct. 1954. DLC (RD1.A7, v. 115)

This article presents some of the background of Mlle. Geneviève de Gal-

lard-Terraube, French flight nurse and heroine of Dien Bien Phu, that led to her visit of the U.S.A.F. School of Aviation Medicine Flight Nurse Branch. A brief description is included, comparing the training of French Airborne Nurses with that received by U.S.A.F. Flight Nurses.

3686
Zeveke, A. V.
[A NEW ARTIFICIAL RESPIRATION APPARATUS] Novyĭ priobor dlĭa iskustvennogo dykhaniĭa — Biŭlleten' eksperimental'noĭ biologii i meditsiny (Moskva), 38 (8): 72-74. Aug. 1954. In Russian. DLC (R91.B56, v. 38)

Two schematic drawings and a detailed description are presented of a new apparatus for artificial respiration, which can be easily and conveniently adjusted for use under all types of laboratory conditions with any species or size of experimental animal. The author also claims that, by making appropriate adjustments and suitable settings, the apparatus can be made to control the rate of air inhalation and exhalation over long periods of time with a high degree of dependability and precision.

3687
Zhukovich, A. V.
[EXPERIMENTAL DATA ON THE PROBLEM OF THE ROLE OF THE HIGHER SEGMENTS OF THE CENTRAL NERVOUS SYSTEM IN VESTIBULAR FUNCTION] Eksperimental'nye materialy k voprosy o roli vysshikh otdelov tsentral'noĭ nervoĭ sistemy v vestibuliarnoĭ funktsii. — Vestnik otorino-laringologii (Moskva), 16 (2): 40-47. March-April 1954. In Russian. DLC (RF1.V4, v. 16)

Records of biocurrents made simultaneously from the cortical and subcortical regions of the brain of rabbits enabled the author to draw the following conclusions: (1) The most constant component part of biopotentials elicited from the temporo-parietal region of the cortex of rabbits at rest consisted of waves of the human alpha-wave type having a rhythm of 7-10 vibrations per second. The background of basal electroencephalograms consisted of waves having a frequency of 3-6 vibrations per second with high frequency rhythms superimposed over them. (2) Upon vestibular stimulation of the cortical or subcortical regions of the rabbit's brain, there was observed, in most instances, an enhanced activity in the form of increased amplitude, a reduction in the rhythm frequency, and an increased beta-rhythm activity. (3) In contrast to other types of stimulation, vestibular stimulation elicited an increase of the wave amplitude accompanied by a reduction in the vibration frequency; however, enhancement of the beta-rhythm activity conformed with other types of stimulation. And (4) the fact that changes were induced in the electrical activity of the cortical and subcortical regions of the brain of animals following vestibular stimulation confirms the assumption that higher regions of the central nervous system participate in bringing vestibular reactions into play.

3688
Ziller, R. C.
FOUR TECHNIQUES OF DECISION MAKING UNDER UNCERTAINTY [Abstract]. — Amer. Psychologist, 9 (8): 498. Aug. 1954. DLC (BF1.A55, v. 9)

Military air crews frequently find themselves in situations in which they are forced to select a course of action from a limited number of alternatives all of which involve uncertainty and risk. It was the objective of this study to explore the group members' reactions to four techniques of decision making in a mock situation of the type described above. Decision-making techniques considered were: (1) authoritarian, (2) leader-suggestion, (3) group-leader census, (4) leader-chairman. Forty-five regular air crew members, in groups of ten, were used as subjects. Experimental procedure was: (a) orientation of the group to the study,

(b) completion of the sociometrics, attitude questionnaire, and F scale, (c) private orientation of the leader to the decision-making technique assigned to his group, (d) presentation of the decision-making incident, (e) group decision, and (f) decision-making questionnaire. A high negative correlation was found between satisfaction with decision and perception of the degree to which the group was unified during the discussion ($r = -.88$). It was found that there was less need for participation when the problem was perceived as being relatively easy ($r = .59$). Regarding techniques, the crew members expressed most satisfaction with the group-leader census technique, and least satisfaction with the authoritarian technique. If the decision-making process was group-centered rather than leader-centered, the group reached a decision which involved greater personal risk to the group. Other results are discussed.

3689
Zimmerman, W. S.
HYPOTHESES CONCERNING THE NATURE OF THE SPATIAL FACTORS. — Educational and Psychol. Measurement, 14 (2): 396-400. Summer 1954.
DLC (BF1.E3, v. 14)

As a result of a series of factor analyses of Army Air Force tests, it was demonstrated that the variance of tests formerly appearing on a single spatial factor could be split into at least two, or possibly three factors, the first designated as Visualization and the second as Space. The author discusses two hypotheses which had been advanced to explain the nature of these spatial factors. The first, the directional discrimination hypothesis, has apparently been refuted, as far at it applies to the original AAF Spatial Relations factor. A factor analysis of a battery of perceptual tests including tests of directional discrimination gave several new directional factors, but failed to identify the Spatial Relations factor as one of them. The second hypothesis proposes a continuum of complexity or difficulty, with each of the four factors in successive relative positions — from Perceptual Speed through Space and Visualization to Reasoning. Factor analysis of the Visualization of Maneuvers test, administered in three forms of varying difficulty to aviation students, partially supports the order of the first three factors on a continuum hypothesis. None of the tests revealed significant loadings in Reasoning. If the continuum hypothesis is valid, the points on continuum, where each of these factors appear, will vary due to individual differences among subjects.

3690
Zimmerman, W. S.
THE INFLUENCE OF ITEM COMPLEXITY UPON THE FACTOR COMPOSITION OF A SPATIAL VISUALIZATION TEST. — Educational and Psychol. Measurement, 14 (1): 106-119. Spring 1954. DLC (BF1.E3, v.14)

Three forms of an AAF experimental test, Visualization of Maneuvers, differing in the level of difficulty, were factor analyzed to determine their comparative factor structure. It had previously been hypothesized that a variation in factor pattern could be demonstrated among the three forms, which would show four factors (Perceptual Speed, Space, Visualization, and Reasoning) on a continuum of difficulty and complexity. The results of the analyses supported the hypothesis for the first three factors but not for the fourth. The easier, more speeded form of the test gained by far the highest loading on Perceptual Speed, the test of medium difficulty led the others on Space, although not as convincingly, and the most difficult of the three led the others with a heavy weight in Visualization. Whether an even more difficult form of the same test would sample Reasoning could not be inferred from the data. (Author's summary, modified)

3691
Zyak, J., 1953
Z. Kaleta, and J. Szamborski
[THE BLOOD SUGAR LEVEL IN ALBINO RATS SUBJECTED TO ANOXIA]
Zmiany zawartosci cukru we krwi w obniżonym ciśnieniu atmosferyczynym. — Acta physiologica polonica (Warszawa), 4 (4): 297-319. 1953. In Polish, with English summary (p. 317). DNLM

Well-fed rats exposed to 10,000 meters of altitude showed marked primary hyperglycemia followed by hypoglycemia. Under the same conditions, starved rats demonstrated a weaker hyperglycemia reaction followed by hypoglycemia. It is suggested that part of the acute symptoms of altitude sickness may be related to the hypoglycemia induced by hypoxia. The degree of the hypoglycemia reaction depends on blood sugar values before the experiment, the length of time an animal is exposed to low barometric pressure, and to a lesser degree on the body composition. (Authors' summary, modified)

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The following pages contain cumulated corporate-author, secondary-author, and subject indexes covering the contents of volume I and II.

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